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Chapter Five

Descartes, Spinoza and Leibniz

"The chief defect of all previous materialism (that of Feuerbach included) is that things, reality, sensuousness are conceived only as the form of the object, or of contemplation, but not as sensuous human activity, practice, not subjectively. Hence, in contradistinction to materialism, the active side was set forth abstractly by idealism—which, of course, does not know real, sensuous human activity, practice, not subjectively." (MECW, Vol. 5, p. 3.)

This phrase of Marx, from the First Thesis on Feuerbach has often caused a certain puzzlement. Its meaning is not immediately clear, nor can it be made clear unless we place it in the context of the history of philosophy. Yet the idea contained within it is the starting-point for the development of dialectical materialism, and of Marxism in general.

Once thought begins to develop, it takes on a certain life of its own, which proceeds more rapidly with the development of the division of labour and the growth of civilisation, which coincides with the division of society into classes. Thought itself becomes an object of study. Its material origins are

lost sight of. It appears as something mystical, separate and apart from matter, a divine substance, linked to God, an immortal soul, independent of our body, which will not perish when we die.

The rise of a new kind of materialism in the period of the Renaissance was the prior condition for the rebirth of science on a qualitatively higher level. But, as we have seen, it suffered from a one-sidedness, in the form of empiricism, which had extremely negative consequences. The denial of the validity of anything which did not come from immediate observation, the rejection of theory and broad generalisations ("I do not make hypotheses," Newton said)

doomed this kind of materialism to sterility. The main result was that the representatives of this school could not rise above the limitations of the outlook of the science of the day, which was fundamentally mechanical and static in character. This defect applies not only to the English empiricists, but even to the French materialists, despite their far broader outlook and occasionally brilliant forays into dialectics.

The old materialism was one-sided in that it considered human thought in a static, passive and contemplative way. Man was merely an observer of nature, taking note of "the facts." "The mind is to it in itself void, a mere mirror of the

external world, a mere mirror of the external world, a dark room into which the images of the things without fall, without any contribution or action its part; its entire contents are due to the impressions made on it by material things." (Schwegler, op. cit., p. 180-1.) Setting out from a correct idea, this narrow conception of materialism ended up in a blind alley, incapable of further development. In fact, until the revolution effected by Marx and Engels and their theory of materialist dialectics, no further development of materialism took place. Even Feuerbach really went no further than the French materialists of the 18th century.

We therefore come face to face with one of the greatest paradoxes in the history of philosophy—that the really significant advances in thought in the period after Locke were made, not by the materialists, but by the idealists. Unrestricted by the self-imposed limits of empiricism, they arrived at a whole series of brilliant theoretical generalisations, although, setting out from false hypotheses, they invariably had a fantastic character. This peculiar phenomenon reached its most extreme expression in the philosophy of Hegel, "the most colossal miscarriage in history," where all the main elements of dialectics appear in a systematic form, but standing on their head, as Marx put

it.

That thought and being are two different things is self-evident to most people. In one of his comedies, Sheridan, the great Irish dramatist of the 18th century, makes one of his characters, an inveterate gambler, say "I never lose at cards—or, at least, I never feel that I am losing, which is the same thing." Of course, we know that it is not the same thing, just as it is not the same thing to think one has a million pounds, and actually to possess that amount of money. Thought itself is immaterial, despite the efforts of some mechanical materialists to prove that it is a material substance, secreted by the brain, as bile is secreted from the liver.

Thought is the property of matter organised in a particular way, but it is not itself matter. The question arises, if thought and material reality are completely different, how does it happen that they are so often found to be in agreement? The exact relation between thought and being was the source of all the main philosophical disputes for two and a half thousand years, and was only resolved satisfactorily by dialectical materialism.

The question of the relation of thought to being was posed by the French philosopher Descartes (1596-1650) in a different way to the English empiricists. Born into a moderately wealthy family,

he had studied with the Jesuits. This taste of arid orthodoxy produced in him a lifetime's aversion for dogmatism of any kind, and an impatience with received ideas. His scepticism, in contrast with the jaundiced pessimism of Hume, had a lively and positive character. He began to doubt, not the possibility of knowledge in general, but only the existing opinions put forward as infallible truths. From an early age, his motto was "Doubt everything."

"And, as I made it my business in each matter to reflect particularly upon what might fairly be doubted and prove a source of error, I gradually rooted out from my mind all the errors which had

hitherto crept into it. Not that in this I imitated the skeptics who doubt only that they may doubt, and seek nothing beyond uncertainty itself; for, on the contrary, my design was singly to find ground of assurance, and cast aside the loose earth and sand, that I might reach the rock or the clay." (Descartes, Discourse on Method, p. 23)

"For these reasons," he wrote, "as soon as my age permitted me to pass from under the control of my instructors, I entirely abandoned the study of letters, and resolved no longer to seek any other science than the knowledge of myself, or of the great book of the world." (ibid, p. 8.) In order to gain knowledge and

expand his horizons he enlisted first in the Dutch and then the Bavarian army, at the start of the Thirty Years War. While still in the army, he wrote a book on philosophy, but, on hearing of the trial of Galileo, he decided to withhold publication for fear of provoking the anger of the Church. Later on, his writings appear liberally sprinkled with references aimed at placating the religious authorities and averting the dreadful charge of godlessness. Even so, like Locke, he felt obliged to move to Holland, the only country in Europe where there existed a relatively free atmosphere to speak and write. Even here he faced the attacks of religious bigots (in this case, Protestants), who

accused him of atheism. Only the personal intervention of the Prince of Orange saved him from prosecution. Even then, the authorities of the University of Leyden placed him under a total ban, forbidding the very mention of his name. Eventually, he had to move to Sweden, where he died, partly because of the effects of the climate on his weak constitution.

While, in all probability, Descartes was a believer, when reading his works, one has the impression of a man all the time looking over his shoulder. In order to get round the Church, Descartes accepts the existence of God, but then says that religion is too lofty a subject to be

"submitted to the impotency of our reason." When dealing with natural history, he accepts that God created the world, but then adds, as if hypothetically, that "it may be believed, without discredit to the miracle of creation, that, in this way alone, things purely material might, in course of time, have become such as we observe them at present; and their nature is much more easily conceived when they are beheld coming in this manner gradually into existence, than when they are only considered as produced at once in a finished and perfect state." (Ibid., p, 36.) To such subterfuges did the greatest French philosopher have to resort in order to publish his ideas.

In the field of science, Descartes' approach was the exact opposite of his English counterparts. Whereas they put all the emphasis on experiment, his approach was rationalistic, more concerned with general principles than the detailed work of observation. His contribution to science was outstanding, especially in the field of mathematics, where he may be considered one of the founders of analytical geometry. His great contribution was the invention of co-ordinate geometry, which determines the position of a point in a plane by its distance from two fixed lines. In physics, he was a materialist, as Marx and Engels point out:

"Descartes in his physics endowed matter with self-creative power and conceived mechanical motion as the manifestation of its life. He completely separated his physics from his metaphysics. Within his physics, matter is the sole substance, the sole basis of being and of knowledge." (MECW, Vol. 4, p. 125.)

Yet Descartes was unable to resolve the fundamental question of the relation between thought and being. In his celebrated Discourse on Method, he searches for a truth which everyone can accept as unquestionable. He comes up with the famous phrase "I think, therefore I am." This is the corner-stone

of his philosophy. And yet it does not follow. At most he could assert, "I think, therefore thought exists." What is this "I"? Evidently a human nervous system, a brain, a body, and so on. Gassendi, the French materialist, objected that existence may equally well be inferred from every other human function. Idealists replied that none of these functions can be perceived without thought. But it is also necessary to say what thought is.

Thought, from a consistent materialist position is matter that thinks. It does not and cannot exist by itself, separate from matter. On this decisive question Descartes adopted an unsatisfactory and

inconsistent position, which ended up in all kinds of contradictions. The fundamental difference between thought and matter, he said, was that matter had extension, whereas thought, spirit, soul, had none. This leads us straight to a dualist position. According to Descartes, there is nothing in common between thought and matter. They are not only different, but diametrically opposed. The union of soul and body is, therefore, an entirely mechanical one. The soul inhabits the body as an alien thing, a mechanical and entirely artificial relationship. Without the soul, the body is like a lifeless machine or automatum. Even the best-constructed robot cannot acquire a human consciousness, even if

it is programmed to speak (this was written in 1637, but the subject matter is very modern).

For example, a machine may be taught to speak and even express "feelings," "but not that it should arrange them variously so as appositely to reply to what is said in its presence, as men of the lowest grade of intellect can do. The second test is, that although such machines might execute many things with equal or perhaps greater perfection than any of us, they would, without doubt, fail in certain others from which it could be discovered that they did not act from knowledge, but solely from the disposition of their organs: for while

reason is an universal instrument that is alike available on every occasion, these organs, on the contrary, need a particular arrangement for each particular action; whence it must be morally impossible that there should exist in any machine a diversity of organs sufficient to enable it to act in all the occurrences of like, in the way in which our reason enables us to act." (Descartes, op. cit., pp. 44-5.)

The lower animals are classed as "automata" for the same reason. It is worth quoting this passage at some length because it shows a markedly materialist line of argument, and certainly is vastly superior to the mystical nonsense talked by some

scientists today in relation to animal intelligence, such as our friend Dr. Wickremassinge and his ants, who keep the secret of their success to themselves:

"For it is highly deserving of remark, that there are no men so dull and stupid, not even idiots, as to be incapable of joining together different words, and thereby constructing a declaration by which to make their thoughts understood; and that on the other hand, there is no other animal, however perfect or happily circumstanced, which can do the like. Nor does this inability arise from want of organs: for we observe that magpies and parrots can utter words like ourselves, and are yet unable to speak as

we do, that is, so as to show that they understand what they say: in place of which men born deaf and dumb, and thus not less, but rather more than the brutes, destitute of the organs which others use in speaking, are in the habit of spontaneously inventing certain signs by which they discover their thoughts to those who, being usually in their company, have leisure to learn their language.

"And this proves not only that the brutes have less reason than man, but that they have none at all: for we see that very little is required to enable a person to speak; and since a certain inequality of capacity is observable among animals of

the same species, as well as among men, and since some are more capable of being instructed than others, it is incredible that the most perfect ape or parrot of its species, should not in this be equal to the most stupid infant of its kind, or at least to one that was crack-brained, unless the soul of brutes were of a nature wholly different from ours." (Ibid., pp. 45-6.)

Descartes' idealism led him into the trap of dividing mind from body, and regarding the body as a mere automaton, inside which the soul dwelt. This became a source of considerable confusion, and had a harmful effect on the scientific understanding of the real

nature of the mind and its relation to the body, the brain and the nervous system.

Despite the generally idealist thrust of the Discourse, Descartes' materialist physics and biology keep on intruding. He cannot, for example, conceal his enthusiasm for Harvey's discovery of the circulation of the blood, to which he dedicates no fewer than six pages. Yet when he comes to the vexed question of the relationship of mind and body, he takes refuge in unscientific and metaphysical concepts. He locates the soul in the so-called "pineal gland" in the centre of the brain, purely because all the other parts of the brain are double, and therefore disqualified from

acting as the organ of the soul, which would thereby presumably end up with a bad case of double-vision!

The problem with all this is that, if thought and matter are considered as completely separate, by what means are they united and kept together? The only option open to Descartes was to bring in an external agent—divine intervention. Even so, it is impossible to see how they can have any effect upon each other. By what mechanism could they interpenetrate? For example, the mind can will that I lift my arm, but how can it actually lift it? Descartes' disciple, Geulinx, answered with admirable frankness that it could not, that the fact

that the arm rises at the same time as I will it to was mere coincidence. This brings out the contradiction of the Cartesian philosophy, the unresolved dualism, which was its Achilles' heel.

Despite its weaknesses, Descartes' philosophy had a notably progressive side. Its advances in science stimulated the growth of natural science in France. Philosophically, Descartes' idealism was overthrown by the prevailing materialist trend of the Enlightenment, though he influenced people like La Mettrie. But outside France his ideas were the starting point for two of the greatest philosophers of all, Spinoza and Leibniz.

Spinoza

Benedictus (Baruch) Spinoza was born in Amsterdam in 1632, the son of a Jewish merchant, one of the many who had fled from Portugal and Spain to escape from religious persecution. From his youth, Spinoza showed himself to be a fearless searcher after truth, prepared to defend his views regardless of the consequences to himself. It was intended that he should carry on the family business, but in 1656, despite having been a diligent student of the Bible and the Talmud, he fell foul of the orthodox rabbis. He was offered 1,000 florins a year to keep silent, but refused and was cursed and expelled from the Jewish

community for his "wrong opinions" and "horrible heresies." Fearing an attempt on his life, he had to flee from Amsterdam. He took up residence at Rhynsburg near Leyden, where he earned his living polishing lenses, while dedicating his spare time to his philosophical writings.

As an outcast himself, Spinoza became friendly with the members of some of the smaller Protestant sects, related to the Anabaptists, who were themselves the victims of persecution and who were open to discuss new ideas. At this time the ideas of Descartes were the subject of a raging controversy in Holland. In 1656, university professors were

required to take an oath that they would not propound Cartesian ideas which caused offence. To the little circle around Spinoza, Descartes was seen as a source of inspiration, as a brave soul who refused to base his opinions on mere tradition, and affirmed that all we know is known by the "natural light" of reason. Descartes was an inspiration to Spinoza, but the latter had too keen an intellect to accept him uncritically.

This was an age of great discoveries. Science was beginning to stretch its wings, and the old Aristotelian world view was being replaced by the new scientific-mechanistic view of nature. Galileo himself had written that he

believed that the book of nature was written in the language of mathematics. Spinoza's whole outlook was dominated by a passionate interest in nature and science. He conducted a correspondence with the English chemist Robert Boyle, discussed comets with Henry Oldenburg, the secretary of the Royal Society, and comments on Descartes' laws of motion and the theories of Huygens.

Holland was the freest country in Europe at this time. The Dutch bourgeoisie had succeeded in throwing off the yoke of Spanish domination by a revolutionary struggle in which it leaned for support on the lower middle class and semi-proletarian masses. In 1579, the

provinces of the Protestant Netherlands came together to form the Union of Utrecht, out of which the Dutch Republic emerged. Article three of the Union proclaimed religious toleration as a basic principle. However, from the outset this was opposed by the powerful sect of "strict" or "precise" Calvinists, who wanted only one official Church in Holland—their own.

At the Synod of Dordrecht (1618-19) they succeeded in getting Calvinism recognised as the official religion. But the liberal Jan de Wit, who was the leader of the Netherlands from 1653 to 1672, stood firm against religious intolerance. Spinoza did not stand aloof

from the political struggle. He set aside work on his Ethics in order to publish a book in defence of the freedom of speech and thought, the Treatise on Theology and Politics, which appeared in 1670. This earned him the bitter enmity of the strict Calvinists, who were scandalised by his attempts to show that the Bible is not to be seen as containing philosophical or scientific truths.

In July 1670 the Synod declared the Treatise an "evil and blasphemous book." An anonymous pamphlet attacking de Wit described the book as "spawned in Hell by a renegade Jew and the Devil," and that it was "published with the knowledge of Mr. Jan de Wit."

In 1672 a French army invaded Holland and de Wit was murdered by a mob in The Hague. For opportunist reasons, William of Orange sided with the Calvinists. Two years later the Treatise was banned. For the rest of his short life, Spinoza was forced to keep his head down. Tragically, his masterpiece, the Ethics, was never published in his lifetime, for fear of the reaction of the Church. It only appeared in 1677, the year the great man died of consumption.

Spinoza was one of those true geniuses who carried out a real revolution in philosophy. Taking as his starting point the philosophy of Descartes, he completely transformed it, and in so

doing, laid the basis for a genuinely scientific approach to nature. "It is therefore worthy of note," wrote Hegel, "that thought must begin by placing itself at the standpoint of Spinozism; to be a follower of Spinoza is the essential commencement of all Philosophy." (History of Philosophy, Vol. 3, p. 257.) Not only Hegel, but Goethe, Schiller, Marx, and the young Schelling were much influenced by Spinoza. When Einstein was engaged in a philosophical dispute with Niels Bohr over the fundamental problems of quantum mechanics, he wrote that he would rather have "old Spinoza" as a referee instead of Bertrand Russell or Carnap.

Maybe that is why, with his customary arrogance, Bertrand Russell in his History of Western Philosophy writes that the whole of Spinoza's "metaphysic" is "incompatible with modern logic and the scientific method. Facts have to be discovered by observation, not by reasoning; when we successfully infer the future, we do so by means of principles which are not logically necessary, but are suggested by empirical data. And the concept of substance, upon which Spinoza relies, is one which neither science nor philosophy can nowadays accept." (B. Russell, op. cit., p. 560.)

The whole point is that Spinoza, by not

restricting himself to the narrow confines of empirical philosophy, was able to transcend the limits of the mechanistic science of the day. While Berkeley and Hume led philosophy into a blind alley (and also science, if it had paid any attention to them, which fortunately it did not), Spinoza brilliantly showed the way forward. In spite of the ridiculous pretensions of Russell and his fellow logical positivists, who—without the slightest basis—put themselves forward as the supreme guardians of an alleged "scientific method" arbitrarily defined by themselves, science proceeds in an entirely different way to that indicated in these lines.

In particular, the role of great hypotheses in pointing scientific research in the right direction has been fundamental. And, by definition, a hypothesis can only be based on a limited number of "facts," and must involve reasoning, and also courage and imagination. How much time and effort would have been saved if scientists had paid attention to Kant's nebular theory of the origin of the solar system, for example? And how much time is now being wasted in the search for "cold, dark matter," which is based upon no "observed facts" whatever, and which is intended to support a cosmological hypothesis more fantastic than anything Spinoza ever thought of.

"It is to the highest credit of the philosophy of the time that it did not let itself be led astray by the restricted state of contemporary natural knowledge, and that—from Spinoza down to the great French materialists—it insisted on explaining the world from the world itself and left the justification in detail to the natural science of the future."

(Engels, *The Dialectics of Nature*, p. 36.)

Spinoza, by the strength of reason, and with the very limited scientific results available to him, arrived at one of the greatest hypotheses of all time. Breaking with Descartes, with his notion of a body without a soul and a soul without a

body, he advanced the idea that body and mind are two attributes of one and the same thing. The universe is not composed of mind and matter, as alleged by Descartes' dualism. There is only a single Substance, which contains within itself all the attributes of thought and being. It is infinite and eternal, and possesses all the potential to give rise to the abundance of phenomena we see in the universe.

Spinoza gives this Substance the name of "God." But in reality, to make God equal to nature is to abolish God, a fact which was not lost on Spinoza's enemies, when they accused him of atheism. In Spinoza's universe, infinite and eternal,

and therefore uncreated and unbounded by heaven or hell, there is no room for a separate deity, indeed, no room for anything whatsoever except Substance, which is just another way of saying nature.

Thus, in a strange way, the philosophy of Spinoza, despite its idealist appearance, is the real point of departure for materialism in the dialectical, that is, non-mechanical sense of the word. All that is necessary is to substitute the word "matter" for "God," and we get a perfectly consistent materialist position. As Marx wrote in a letter to Lassalle on May 31st 1858:

"Even in the case of philosophers who give systematic form to their work, Spinoza for instance, the true inner structure of the system is quite unlike the form in which it was consciously presented by him." (MECW, Vol. 40, p. 316.) The great admiration of Marx and Engels for Spinoza was revealed by Plekhanov, who recalls a conversation he had with Engels, then an old man, in 1889: "'So do you think,' I asked, 'old Spinoza was right when he said that thought and extent are nothing but two attributes of one and the same substance?' 'Of course,' Engels replied, 'old Spinoza was quite right'." (Plekhanov, Selected Philosophical Works, Vol. 2, p. 339.)

The existence of the material universe is taken as an axiom. The model for Spinoza was geometry, which sets out with axioms—self-evident assertions which require no proof. Yet the same people who are prepared to accept on trust the axioms of Euclid (which, incidentally, so far from being self-evident truths, are open to serious objections) nevertheless display extreme reluctance to admit the reality of the material world, declaring this to be beyond our knowledge to assert. Yet this same material world is the starting-point of all our experience and knowledge.

"God or a substance consisting of attributes each of which expresses eternal and infinite essence, necessarily

exists," proclaims Spinoza (Spinoza, The Ethics, p. 9). Moreover, matter can neither be created nor destroyed, only changed:

"Matter is the same everywhere, and its parts are not distinguished one from the other except in so far as we conceive matter to be affected in various ways, whence its parts are distinguished one from the other modally but not in reality. E.g., we can conceive water, in so far as it is water, to be divided and its parts separated one from the other: but not in so far as it is corporeal substance, for then it is neither separated nor divided. Again, water, in so far as it is water, can be made and destroyed, but in so far as it

is substance it can neither be made or destroyed." (Ibid, p. 16.)

God thus has no existence separate and apart from the material world, which has not been created because it has always existed. He is "free"—to obey the laws of nature, and so on. In other words, "God" is only nature. This Pantheism of Spinoza is really a thinly-disguised materialism. Despite its peculiar form (probably an unsuccessful attempt to ward off accusations of atheism), this is head and shoulders above the mechanistic outlook of contemporary scientists. Instead of the mechanical conception of matter being moved by an external force, here we have matter

which moves according to its own inherent laws, it is "its own cause."

Thought can have no existence apart from Substance (matter). It is an attribute of matter organised in a certain way, "consequently thinking substance and extended substance are one and the same substance, which is comprehended through this and now through that attribute." In other words, thought and matter are "one and the same thing, but expressed in two ways" (ibid., p. 42). This is a real breakthrough. In essence, we have here a correct assessment of the relation between thought and being; not, as in Descartes, a radical separation of the two, but their dialectical unity. Not

thought opposed to matter, but matter that thinks. Here Spinoza comes close to an overtly materialist position: "The mind," he says, "has no knowledge of itself save in so far as it perceives the ideas of the modifications of the body" (ibid., p. 59). And again, "For the human body...is affected by external bodies in many ways and disposed to affect external bodies in many ways. But the human mind...must perceive all things which happen in the human body." (Ibid., p.53.)

This presentation was far superior to the crude conception of mechanical materialism which saw thought as a material substance secreted from the brain, as sweat from the sweat glands.

Spinoza, following Descartes, says that thought differs from matter in that it has no extension. It is not a material thing, but the very function of the brain itself, its essential property. Thought is not merely an abstract contemplative activity, but the way in which thinking beings react to their environment at the conscious level. It is not possible to separate thought from all other human activities. Thought, as Spinoza understood, is one of the attributes of highly organised matter, nature that thinks, and not something opposed to nature:

"If this were so, it must seem most odd that consciousness and nature, thinking

and being, the laws of thought and the laws of nature, should so closely correspond. But if we then ask what thought and consciousness are and whence they come, we find that they are products of the human brain and that man himself is a product of nature, who has developed in and along with his environment; whence it is self-evident that the products of the human brain, which in the last analysis are also products of nature, do not contradict the rest of nature's interconnections but correspond to them." (Engels, Anti-Dühring, p. 44.)

Here thought and matter are different but not mechanically opposed, mutually

exclusive opposites. Spinoza understood that matter ("Substance") contains within itself all that is necessary to give rise to thought. Given the right concatenation of factors, organic matter arises out of inorganic matter. And even the most primitive life-forms can evolve to produce thinking beings. There is not, as Descartes thought, an absolute dividing line separating organic from inorganic matter, or man from the animals. In all these ideas, Spinoza showed himself to be far in advance of his times.

Spinoza believed that mastery over nature and the improvement of man were the main purpose of the pursuit of knowledge. In the field of ethics and

morality too, he defends very advanced ideas. He correctly understood that morality was relative:

"As for the terms good and bad, they also mean nothing positive in things considered in themselves, nor are they anything else than modes of thought, or notions, which we form from the comparison of things with each other. For one and the same thing can at the same time be good, bad, and indifferent. E.g., music is good to the melancholy, bad to those who mourn, and neither good nor bad to the deaf. Although this be so, these words must be retained by us." (Spinoza, Ethics, p. 141.)

He rejected the idea of free will, and instead advocated a thoroughly determinist position. There are no "free" actions, in the sense that all actions are caused by something, whether we are aware of it or not. Spinoza was the first one to give a dialectical appraisal of the relation between freedom and necessity, when he pointed out that real freedom consists in the understanding of necessity. True freedom does not consist in denying the existence of the objective laws of nature, but in striving to understand them, in order to gain mastery over them.

He opposed prejudice and superstition wherever he found them, and long before

the French Enlightenment, decided to summon all prejudices to the "court of reason." For those who take refuge in the will of God, "the asylum of ignorance," he has nothing but contempt. In the following passage, he was undoubtedly speaking from painful personal experience:

"Thus again, when they see the human body they are amazed, and as they know not the cause of so much art, they conclude that it was made not by mechanical art, but divine or supernatural art, and constructed in such a manner that one part does not injure another. And hence it comes about that someone who wishes to seek out the true

causes of miracles, and to understand the things of nature like a man of learning, and not stare at them in amazement like a fool, is widely deemed heretical and impious, and proclaimed such by those whom the mob adore as the interpreters of nature and the Gods." (Ibid., p. 34-5.)

The basic idea of Spinoza's philosophy is monism—the idea that all things are one. All the myriad forms of existence, the shapes, colours, forms of movement, are only different expressions of the same Substance, which can assume an infinite variety of forms. These accidental, temporary phenomena he calls "modi" (singular, modus). They are the the forms which matter assumes,

continually coming into being and disappearing, like the restless waves on a mighty ocean. But these transitory forms of being can have no separate existence, independent from Substance, unbounded and eternal, which, operating according to its own laws, must give rise to an unlimited number of particular, finite forms. These forms, in turn, are not free agents, but subject to natural laws which determine the existence of all things. Through the agency of reason, it is possible to understand these laws and thereby achieve freedom consciously to determine our actions and comprehend our true place in the universe.

This imposing philosophy is in complete

accord with the discoveries of modern science. All the endless forms of organic and inorganic matter we see in the universe can be reduced to the same substance—molecules, atoms and subatomic particles. According to the latest theories, a small number of quarks are put together in different ways to make hundreds of hadrons, which combine to form the nuclei of a hundred or so chemical elements. Together with leptons, they then make up atoms, which then combine to make molecules, out of which everything else is built. The same material substance therefore underlies all the forms of being in the universe. Of course, this picture is much more complicated than the one painted by

Spinoza, who had only the scantiest information to go on. A long period of scientific advance was necessary before his picture of the universe could be properly corroborated. But his hypothesis that everything comes from a common substance has been substantially vindicated.

The principle of monism can be interpreted either in a materialist or an idealist sense. Plato and Hegel were also monists, because they considered that the universe and everything in it was ultimately an expression of the "Absolute Idea." Marx and Engels were materialist monists. Spinoza's case is peculiar. While formally he has to be

considered an idealist, there is an element of ambiguity about his Substance which is certainly open to a materialist interpretation. This was quickly grasped by his contemporaries, Jews and Christians alike, who accused him of atheism. All kinds of heinous crimes and immoral ideas were attributed to him. For a long time after his death his name could hardly be mentioned in polite society. The German writer Lessing said that, in his day, a century later, people treated Spinoza "like a dead dog."

Despite all the calumnies, Spinoza's philosophy stands as a monument to the great and noble spirit that conceived it.

His philosophy, which came very close to materialism, inevitably led him to draw the most advanced social conclusions, in contrast to the reactionary misanthropy of Hume and Berkeley. This comes across clearly in the pages of his masterpiece, *Ethics*:

"Man is a God to man. Yet it rarely happens that men live under the guidance of reason, but among them things are in such a state that they are usually envious of or a nuisance to each other. But nevertheless they are scarcely able to lead a solitary life, so that to many the definition of man as a social animal has been very attractive; and in truth things are so ordered that from the common

society of men far more conveniences arise than the contrary. Let satirists therefore laugh to their hearts' content at human affairs, let theologians revile them, and let the melancholy praise as much as they can the rude and uncultivated life: let them despise men and admire the brutes—despite all this, men will find by experience that they can procure with mutual aid far more easily what they need, and avoid far more easily the perils which beset them on all sides, by united forces: to say nothing of how much better it is, and more worthy of our knowledge, to regard the deeds of men rather than those of the brutes" (Ibid. p, 161-2.)

Leibniz

To see a World in a Grain of Sand
And a heaven in a Wild Flower,
Hold Infinity in the palm of your hand,
And Eternity in an hour.

(William Blake, Auguries of Innocence,
1)

The monist views of Spinoza were challenged by his great contemporary, Gottfried Leibniz (1646-1716), yet another encyclopaedic mind. Leibniz was a mathematician, physicist, geologist, biologist, diplomat, librarian, and historian. He invented the infinitesimal calculus, although Newton claimed to have done this earlier. In

physics, he anticipated the law of preservation of energy. He is also considered to have been the founder of mathematical logic, although he did not publish his work on this subject.

An objective idealist, Leibniz nevertheless developed dialectics. In his Philosophical Notebooks, Lenin wrote that "Leibniz through theology arrived at the principle of the inseparable (and universal, absolute) connection of matter and motion." Marx also expressed his admiration for Leibniz (see Letter to Engels, 10 May 1870). The basis of Spinoza's philosophy was the single universal substance. Leibniz also starts from the notion of substance but defines

it differently. He sees it like living activity, internal motion, and energy. The fundamental difference with Spinoza is that, where he stressed the singleness of being, Leibniz lays all the emphasis on the multiplicity of the universe. For him, the entire universe is composed of an infinite number of substances which he calls "monads." The monads of Leibniz are similar to the idea of atoms. Whilst in Paris, Leibniz met and was influenced by the materialist Gassendi who had revived interest in the atomistic philosophy of Democritus and Epicurus. For Leibniz, everything is made of monads, including ourselves. However, there are some peculiarities in this theory. To begin with, no monad is like

another. Each is its own special world, impenetrable from without. Leibniz thought that no two things in the world were the same. Each monad (and there are infinite number of them) is also a microcosm, which reflects the universe at large. It is a kind of embryo of the totality of things. Thus, the particular contains the universal.

The entire universe is only the sum total of the monads. Everything is an aggregate of monads, even the human soul. Moreover, these monads are not dead matter, but centres of living activity, in constant movement and mutation. In many respects, this picture is a striking anticipation of the modern

atomistic view of the universe. Probably, Leibniz got his idea from observations through a microscope. Thus, he compares bodies to a fish-pond in which the smallest drop of water is full of teeming life, although it cannot be said that the pond itself lives. Feuerbach compared Spinoza's philosophy to a telescope which makes objects visible to the human eye that are otherwise invisible because their remoteness, whereas that of Leibniz is like a microscope which makes objects visible that are unnoticeable because of their minuteness and fineness. The monad is like an individual cell which contains all the information required to construct an entire body. In the same way, Marx, in

Capital, derives all the contradictions of capitalism from a single cell, the commodity.

Despite its idealistic form, there is here the germ of a profound idea and a dialectical concept of nature, based on movement, infinite connections, change and evolution from a lower to a higher stage. For example, he distinguishes between different levels of monads, from the lowest rank, analogous to the stage of inorganic nature, in which the life of the monads expresses itself only in the form of motion. There are higher stages, analogous to plants, animals, which culminates in the human soul. "Here is dialectics of a kind,"

commented Lenin, "and very profound, despite the idealism and clericalism." (Lenin, Collected Works, Vol. 38, p. 383.) What role does God have in relation to the monads? Not very much, it seems. Leibniz makes God the "sufficient reason" of all the monads. Feuerbach considered him to be only half a Christian, atheist, or a cross between a Christian and a naturalist. As Schwegler remarks: "It was a hard matter for Leibniz to bring—without abandoning the presuppositions of both—his monadology and his Theism into unison." (History of Philosophy, p. 198.)

Leibniz's theory of knowledge is in opposition to the empiricism of Locke

from the standpoint of objective idealism. Leibniz may be considered the father of German idealism. He is best known for his famous doctrine of "the best of all possible worlds," according to which it is impossible that it should be any more perfect world than that which exists. This must have been a comforting thought for the wealthy aristocrats for whom Leibniz worked. But from a philosophical standpoint, their satisfaction would not really be justified. For Leibniz, there are an infinite number of possible worlds, but only one has been chosen by God. In other words, the world we live in at this particular moment is the "best" one because it is the only one. However, the

same Leibniz writes in his *Monadology* number 22:

"Every present state of a simple substance is the natural consequence of its preceding state, in such a way that its present is big with its future." (Leibniz, *Discourse on Metaphysics and Other Writings*, p. 256.) Leibniz's dialectical philosophy, which echoes Heraclitus and anticipates Hegel, was far from defending the idea of an unchanging status quo, "because all bodies are in a state of perpetual flux like rivers, and the parts are continually entering in or passing out." (Leibniz, *Ibid*, p. 267.)

Kant

The German philosopher Immanuel Kant (1724-1804) marks the beginning of a turning point in philosophy. He was born in Königsberg, Prussia, where he spent most of his life. A liberal in politics, he was influenced by the ideas of Rousseau, and sympathised with the French Revolution, at least in the early stages. The other great influence on his thought was science, which at the time was making spectacular advances. Kant himself made an important contribution to science, particularly in his *General Natural History and Theory of the Heavens* (1755). In this, where he put forward the nebular hypothesis for the formation of the solar system, later developed by Laplace, and now

generally accepted.

When Kant began his intellectual activity, German philosophy had reached a dead end. The brilliant flashes of inspiration that characterised the thought of Leibniz did not really add up to a coherent school of philosophy. After his death, Christian Wolff tried to turn it into a system, but succeeded only in vulgarising it. In Wolff's hands, Leibniz's profound intuitions about the world became transformed into the most arid formalism. Kant was repelled by this metaphysical speculation, which attempted to solve the mysteries of the universe, not by looking at nature, but by endless abstract reasoning. Meanwhile,

in the real world, a new spirit was stirring. The natural sciences were developing fast, especially in Britain and France. Even in sleepy Germany, where the Thirsty Years' War had paralysed progress, there was a renewal of culture in the AufklÖrung, the German equivalent of the French Enlightenment. Kant was the true child of his times.

His most important work, the Critique of Pure Reason, was first published in 1781, when he was 57 years old, although it was subsequently revised in the second edition in 1787. In this work, Kant attempts to resolve the problem of knowledge, which had caused a crisis in philosophy, the clearest expression of

which was the subjective idealism of Berkeley and the scepticism of Hume. Kant's declared aim was to finish off the old metaphysics which "appears to furnish an arena specially adapted for the display of skill or the exercise of strength in mock-contests—a field in which no combatant ever yet succeeded in gaining an inch of ground, in which, at least, no victory was ever yet crowned with permanent possession." (Op. cit., p.11.)

The great successes of natural science, especially in Britain, meant that knowledge could not be confined to mere abstract speculation, which sucked its theories out of its thumb. Determined

to break with this "metaphysics," Kant decided that it was necessary to go back to fundamentals. He decided to tackle the thorny question of how true knowledge was to be obtained. On the one hand, the striking advances of natural science pointed the way forward. All those questions about the nature of the universe and man's place in it could not be solved by abstract speculation, but only by observation and experiment.

The task of the sciences is not merely to collect a heap of facts. It is to obtain a rational insight into the workings of nature. For this, mere generalisations are insufficient. Thinking must not be passive but active, as Kant understood.

It is not an accident that the title of his greatest work refers to Reason (Vernunft), which he clearly distinguishes from mere Understanding (Verstand). But are the forms of reason adequate to comprehend reality? Kant subjected these logical forms to a searching criticism, and showed that the traditional logic falls into a state of contradiction (antimony). Kant showed that it was possible to derived diametrically opposite conclusions from the same propositions. But in Kant, this contradiction remains unresolved.

Kant's Theory of Knowledge

The relation of subject-object was a

central question in philosophy for centuries. To simplify things, the mechanical materialists laid all the stress on the object (material reality, nature), leaving no role for the thinking subject, which was portrayed as a passive receptacle (*tabula rasa*), whereas the idealists laid all the stress on the subject (mind, the Idea, etc.).

Kant asks what we can know, and how we can know it. This is one of the central questions of philosophy—the theory of knowledge or cognition ("epistemology"). We derive the greater part of our knowledge from observing the real world. From an early age, we see things, we listen, we touch, and so

on. Gradually, we build up a picture of the world in which we live. This kind of knowledge is the knowledge of sense-perception. For empiricists like Locke, there is no other kind. Here Kant disagrees. In getting to know the world, the mind is not merely an empty vessel, which can be filled with any content (Locke described it as a *tabula rasa*—a blank slate). For Kant, the act of cognition is not passive, but active. We do not simply make a list of the things we see, but consciously select, order and interpret them. For this, the mind has its own method and rules. There are forms of thought wh_ch we apply, consciously or unconsciously, when we attempt to understand the information

provided by our senses ("sense data").

Kant argues that there are two kinds of knowledge. While most knowledge is derived from experience, part of our knowledge is a priori, and not derived from experience. In Kant's opinion, we can only know what is given to us in sense experience. However, the things in themselves, which cause our sensations, cannot be known. Here, Kant is skating on thin ice. Although he denied it, these views seem to be similar to the subjective idealism of Hume and Berkeley. Kant changed some of his formulations in the second edition, precisely to avoid this conclusion. In the first edition, he implied that the thinking

subject might be the same thing as the object which it perceives. Later, he changed this, maintaining that things outside ourselves certainly exist, but they manifest themselves to us only in appearance, not as they are in themselves.

According to Kant, there are some ideas which are not derived from sense-perception. This shows the difference between the philosophy of Kant and that of Locke, who held that all knowledge whatsoever came from the senses. By contrast, Kant claimed that some knowledge was inborn, namely, the knowledge of space and time. If we make abstraction from all physical

aspects of phenomena, he says, we are left with just two things—time and space. Now time and space, together with motion, are the most general and fundamental properties of matter. The only way that it is possible to understand them is in relation to material things. But Kant was an idealist. He insisted that the notions of time and space were inborn. They did not come from experience, but were what he called a priori (from the Latin meaning "from the beginning").

To support his idea that space and time are a priori phenomena, Kant uses a very peculiar mode of reasoning. He maintains that, whereas it is impossible to think of objects without time, it is

quite possible to think of time without objects; the same in relation to space. In point of fact, space and time are inseparable from matter, and it is impossible to conceive of them as "things in themselves."

Kant states that it is possible to imagine space with nothing in it, but impossible to imagine no space. But this is not so. Space without matter is just as much an empty abstraction as matter without space. In point of fact, time, space and motion are the mode of existence of matter, and can be conceived of in no other way. Kant's idea that time and space are outside the range of sense-experience has been refuted by the

discoveries of non-Euclidian geometry.

In Anti Dühring, Engels shows that the whole concept of a priori knowledge is false. All ideas are ultimately derived from reality, even the axioms of mathematics. It is true that, if we leave aside all the material qualities of a thing, all that is left is space and time.

However, these are now empty abstractions. They cannot stand on their own, any more than there can be fruit, without apples, pears, oranges etc.; or humanity, without human beings, and so on. The only difference is that the idea of fruit, or humanity, are abstractions of a particular kind of matter, whereas time and space are the most general features,

or, more correctly, the mode of existence, of matter in general.

The Thing-in-Itself

All human knowledge (cognition) is the product of two factors—the cognising subject and the cognised object. The raw material of knowledge is provided by the external object (the physical world), whereas the subject (the thinking mind) gives form and meaning to the information of the senses. Kant, unlike Berkeley, accepts the existence of an external world, without which there would be no possibility of knowledge, or experience. Nevertheless, Kant denies that it is possible to know things

as they are in "themselves." We can only know appearances. His fundamental mistake was not to see the relation between appearance and essence. It is wrong to think that we can only know "appearances." When I know the property of the thing, I know the thing itself. There is nothing else to know; no "beyond," no Thing-in-Itself.

Now it had been the conviction of every age that the only way of getting to know a thing was precisely by taking the material given to us by our senses, and analysing it by means of reflection. This, and nothing else, is the process of cognition. Here, for the first time, we are confronted with the assertion that there

is some kind of difference between what we can see and experience and the "real" nature of things. This is a most peculiar notion, and one which runs counter to all human experience. It therefore demands a very clear justification. But the fact is that Kant does not justify it at all. He merely asserts it in a dogmatic manner, which is the opposite of what he set out to do.

"It marks the diseased state of the age," remarks Hegel, "when we see it adopting the despairing creed that our knowledge is only subjective, and that beyond this subjective we cannot go." (Hegel, Logic, p. 35.) Hegel, like Kant, was an idealist, but he was an objective

idealist, who never denied that it was possible to know the real world. Such objective idealism is far superior, with all its faults, to the complete confusionism which comes from subjective idealism. It is therefore not surprising that in the "diseased state" of our own age, it is Kant, not Hegel who has found most favour with philosophers and scientists, who wish to convince us that we cannot really assert that the physical world exists, or that we cannot know what happened before the "big bang" (and must not ask), or that the behaviour of sub-atomic particles depends exclusively on whether we are present to observe them.

Against this, we agree a hundred times with Hegel when he says that "everything we know both of outward and inward nature, in one word, the objective world, is in its own self the same as it is in thought, and that to think is to bring out the truth of our object, be it what it may. The business of philosophy is only to bring into explicit consciousness what the world in all ages has believed about thought. Philosophy therefore advances nothing new; and our present discussion has led us to a conclusion which agrees with the natural belief of mankind." (Hegel, *Logic*, p. 35.)

Evidently, at any given moment in time,

we cannot know everything about a phenomenon. Truth is as infinite as the universe itself. But the entire history of human thought is characterised by a constant movement from ignorance to knowledge. What we do not know today, we will discover tomorrow. Therefore, it is a serious mistake to confuse what is not known with what cannot be known. Kant's Thing-in-Itself is merely a way of indicating our present limitations. It is not a mystery, but a problem to be solved. What is today a Thing-in-Itself will tomorrow be a Thing-for-Us. This is the message of the whole history of thought in general, and science in particular.

In reality, the Thing-in-Itself is an empty abstraction. If we take away all the properties of an object which are knowable, we are left with precisely nothing. As J. N. Findlay, echoing Hegel, correctly observes: "The Thing-in-Itself, which Kant holds to be unknowable is really the most completely knowable of all abstractions; it is what we get when we deliberately leave out all empirical content and every vestige of categorical structure." (Foreword to Hegel's Logic, p. xii.) There is a fundamental difference between what is not known and what is unknowable. Kant here slides into agnosticism, the impotent doctrine that says that there are certain things which cannot be known, and therefore, that

there are certain questions which cannot be asked. Findlay is harsh but not unjust when he concludes that "Kant, in short, is in a permanent philosophical muddle, and never knows where he has got to nor where he is going." (Ibid., p. xiv.) The notion of the unknowable Thing-in-Itself is undoubtedly the weakest part of Kant's philosophy, and for that very reason is practically the only bit which has been taken over by the modern philosophers and scientists.

The source of Kant's error was to regard appearance and essence as two mutually exclusive things. Thought, instead of being seen as as a bridge uniting the thinking subject with the world, is

conceived of as a barrier, something standing between the subject and the object. Kant conceives of thought as an instrument which we use to understand the world. This is an unsatisfactory formulation, as Hegel explains:

"A main line of argument in the Critical (i.e., Kantian) Philosophy bids us pause before proceeding to inquire into God or into the true being of things, and tells us first of all to examine the faculty of cognition and see whether it is equal to such an effort. We ought, says Kant, to become acquainted with the instrument, before we undertake the work for which it is to be employed; for if the instrument be insufficient, all our trouble will be

spent in vain. The plausibility of this suggestion has won for it general assent and admiration; the result of which has been to withdraw cognition from an interest in its objects and absorption in the study of them, and to direct it back upon itself; and so turn it to a question of form." (Hegel, Logic, p. 14)

Hegel points out that thought is not an "instrument", like a tool which can be examined before commencing a job. We would be faced with the paradox that the "tool" would have to examine itself, since thought can only be examined by thinking. To seek to know before we know is like the conduct of a man who refuses to go into the water until he has

learnt how to swim. Men and women thought long before logic was ever conceived. In point of fact, the forms of thought, including logic, are the product of a very long period of human development, both mental and practical. The objects of the physical world are immediately given to us in sense-perception. But the matter does not stop there. The understanding gets to work on the information given to it by the senses. It is analysed, broken down into its parts. This is known as mediation in philosophy.

Marx's son-in-law, the French socialist Paul Lafargue, very wittily explains the practical consequences of the theory of

the Thing-in-Itself:

"The workingman who eats sausage and receives a hundred sous a day knows very well that he is robbed by the employer and is nourished by pork meat, that the employer is a robber and that the sausage is pleasant to the taste and nourishing to the body. Not at all, say the bourgeois sophists, whether they are called Pyrrho, Hume or Kant. His opinion is personal, an entirely subjective opinion; he might with equal reason maintain that the employer is his benefactor and that the sausage consists of chopped leather, for he cannot know things-in-themselves.

"The question is not properly put, that is the whole trouble...In order to know an object, man must first verify whether his senses deceive him or not...The chemists have gone deeper—they have penetrated into bodies, they have analysed them, decomposed them into their elements, and then performed the reverse procedure, they have recomposed them from their elements. And from the moment that man is able to produce things for his own use from these elements, he may, as Engels says, assert that he knows the things-in-themselves. The God of the Christians, if he existed and if he had created the world, could do no more." (Paul Lafargue, *Le Matrialisme de Marx et l'Idalisme de*

Kant, in *Le Socialiste*, February 25, 1900.)

Despite his undoubted genius, Kant did a disservice to philosophy and science by implicitly placing a limit on human knowledge. The theory of the unknowable, that part of Kant's philosophy which should have been allowed to quietly sink without trace, is precisely the one thing of Kant which has been taken over in the 20th century by those, like Heisenberg, who wish to introduce mysticism into science. While Kant attempted a critique of the forms of logic (this was his great merit), he displayed a certain inconsistency, for example, in accepting the law of

contradiction. This led him into new problems.

The Forms of Logic

The most important aspect of the Critique of Pure Reason is Kant's criticism of logic:

"That Logic has advanced in this sure course, even from the earliest times, is apparent from the fact that, since Aristotle, it has been unable to advance a step, and thus to all appearance has reached its completion." (Kant, Critique of Pure Reason, p. 8).

An important part of Kant's inquiry concerns the nature of thought-forms in

general, and particularly the the forms of logic. Where do they come from? What do they represent? How far do they reflect the truth? It was to Kant's credit that he asked these questions, although he did not provide an adequate answer, being content to leave that to his successors. This question really goes to the heart of the fundamental question of all philosophy—the relation between thought and being, between mind and matter. Like Hegel, Kant had a very poor opinion of formal logic, a "specious art...which gives to all our cognitions the form of understanding." (Critique, p.68) Kant was the first one to distinguish between Understanding (Verstand) and Reason (Vernunft). Understanding is the

lowest form of rational thinking. It takes things as they are, and merely registers the bare fact of existence. This is the basis of formal logic, and also "common sense" which takes things to be just as they seem.

The process of thinking does not stop at the level of understanding, that is, the mere registering of facts. Reason goes beyond what is immediately given to our eyes and ears, breaks it down into its constituent parts, and puts it together again. This is the role of the Dialectic. Up until Kant, the art of dialectics had been virtually forgotten. It was regarded as mere trickery and sophism, the "logic of illusion". It was Kant's great

achievement to restore dialectics to its rightful place in philosophy, as a higher form of logic.

Kant attempts to put human knowledge on a sound basis, by insisting that it must be based upon experience. However, this is insufficient. Initially in the process of cognition, we are confronted with a confused mass of data, with no logical thread or necessary connection. This would not be generally thought of as real knowledge, still less scientific knowledge. We expect something more. In order to make sense of the information provided by the senses, it is necessary for reason to be active, not merely passive:

"They (the natural scientists) learned that reason only perceives that which it produces after its own design; that it must not be content to follow, as it were, in the leading-strings of nature, but must proceed in advance with principles of judgment according to unvarying laws, and compel nature to reply to its questions. For accidental observations, made according to no preconceived plan, cannot be united under a necessary law. But it is this that reason seeks for and requires. It is only the principles of reason which can give to concordant phenomena the validity of laws, and it is only when experiment is directed by these rational principles that it can have any real utility. Reason must approach

nature with the view, indeed, of receiving information from it, not, however, in the character of a pupil, who listens to all that his master chooses to tell him, but in that of a judge, who compels the witnesses to reply to those questions which he himself thinks fit to propose." (Kant, Critique of Pure Reason, pp. 10-11.)

There is an important difference between the way that Kant and Aristotle understood the laws of logic. For Aristotle, these were laws of things, whereas, for the idealist Kant, they are laws of thought only. The nub of the matter is that, for Kant, the Law of Identity, for example cannot be found in

the objects themselves. It is merely applied to them by consciousness. Thus, for Kant, logic is only a convenient method for ordering and classifying things, whereas dialectics derives its laws from the real world, and applies them back again. This mistaken conception of Kant has been carried over into modern logic and mathematics, where it is often asserted that laws, theorems, etc., are only formal ideas which are used for the sake of convenience, but which have no real relation to the objective world.

The "Antimonies"

The most interesting part of the Critique

of Pure Reason is known as the antimonies. In these, Kant shows the contradictions that exist in thought. Thus, starting with the laws of formal logic, and applying them to the world of experience, Kant precedes to show the contradictions which arise. Kant takes this as proof of the unknowability of the Thing-in-Itself, instead of seeing that the contradictions are objective, and present in the phenomena themselves.

The fundamental problem here is: How do the forms of logic relate to the real world? The categories of formal logic tell us absolutely nothing about the real world. It was the task of science to discover the laws of the real world

through observation and experiment. However, the picture of the world was never complete, since science would inevitably discover new fields all the time, and would have to constantly readjust its theories and propositions. This is the real process. However, Kant drew entirely different conclusions.

Not until Hegel was the reason for these contradictions explained. The problem arises from the nature of formal logic itself, which takes opposites to be mutually exclusive. For example, the logical category of identity presupposes its opposite—difference. When we say that something is, we think we have identified it. However, it only has

identity in comparison to other things. John is John, because he is not Peter, Paul, etc. Thus, identity presupposes difference, and has no meaning in isolation. In general, things have no meaning unless taken together with their opposites. Life cannot be understood without death. North and South, right and left, male and female, good and bad, can only have meaning in relation to their opposites. The unity of opposites is a fundamental fact of existence.

Hegel later explained that pure, undifferentiated being is the same as nothing. If we merely confine ourselves to the assertion that a thing is, without explaining its concrete properties,

internal contradictions, motion and change, and manifold relations, we do not really grasp the truth about it. Without further concretisation, simple being turns out to be an empty abstraction. This particular contradiction ("antimony") can only be resolved by understanding that being and not being are not mutually exclusive, but are combined in the process of becoming.

Similarly, the polar opposites cause and effect have to be united as interaction. If we attempt to isolate a particular cause and effect, immediately land ourselves in a contradiction, since there are always an infinite number of causes which precede the given case; in fact,

behind each isolated fact is the whole history of the universe. Similarly, if we attempt to understand a particular fact as a cause, we will enter into an endless chain of phenomena, following it in time, into infinity.

How to solve this contradiction? If we keep within the rules of formal logic, the only solution to Kant's antimonies, is to deny the validity of exactly one half of its categories, recognising only the other half. The mediaeval Schoolmen, for example, declared that chance (accident) to be a purely subjective concept, a product of ignorance of the causes. Everything in the universe was absolutely determined, in fact,

preordained from the beginning to the end by the Supreme Being. Likewise, Identity was proclaimed to be absolute, and Contradiction rigorously prohibited by the traditional logic.

Kant points out in the section on the antimonies that contradiction is not just a trick of sophists, but is inevitable. The antimonies, where he gives two sets of proofs for two contrary propositions, are "not mere sophistries—are not fallacious, but grounded on the nature of reason..." (Ibid, p. 304). For example, in cosmology, which he was deeply interested in, such questions as whether the universe has a beginning or not.

"Unfortunately for speculation—but perhaps fortunately for the practical interests of humanity—reason, in the midst of her highest anticipations, finds herself hemmed in by a press of opposite and contradictory conclusions, from which neither her honour nor her safety will permit her to draw back. Nor can she regard these conflicting trains of reasoning with indifference as mere passages at arms, still less can she command peace; for in the subject of the conflict she has a deep interest. There is no other course left open to her, than to reflect with herself upon the origin of this disunion in reason—whether it may not arise from a mere misunderstanding. After such an inquiry, arrogant claims

would have to be given up on both sides; but the sovereignty of reason over understanding and sense would be based upon a sure foundation." (Ibid, p. 282.)

The real resolution is the never-ending process of deepening knowledge:

"For it (reason) can give no answer to our question respecting the conditions of its synthesis—except such as must be supplemented by another question, and so on to infinity. According to it, we must rise from a given beginning to one still higher; every part conducts us to a still smaller one; every event is preceded by another event which is its cause; and the conditions of existence

rest always upon other and still higher conditions, and find neither end nor basis in some self-subsistent thing as the primal being." (Ibid, p. 284.)

Every answer only gives rise to a new question, and so on ad infinitum. There are no final answers. No end to the process. Therefore, dialectical thought is undogmatic and open-ended. The solution to the supposedly "unsolvable" problems is given by the never-ending process of the history of science and human thought in general. The only way of resolving the contradictions in thought was by a complete overhaul of logic, breaking down the old rigid schemas, which did not and could not faithfully

reflect the reality of a moving, changing, living, contradictory world. Hegel hailed Kant for reintroducing the notion of contradiction into logic.

"And to offer the idea that the contradiction introduced into the world of Reason by the categories of Understanding is inevitable and essential was one of the most important steps in the progress of Modern Philosophy." (Hegel, Logic, p. 77). However, having posed the question, Kant was unable or unwilling to provide the answer. "But the more important the issue thus raised, the more trivial was the solution." (ibid).

Kant did not achieve this revolution. But his great merit was to point the way forward. Kant gave philosophy a new lease of life, by subjecting the old forms of thought to a thorough criticism, revealing their inherently unsatisfactory and contradictory nature. The Critique of Pure Reason showed that contradictions were inherent in thinking. In so doing, Kant reintroduced dialectics into philosophy. Hitherto, dialectics was regarded as a purely subjective method of reasoning. Kant showed that dialectics was neither arbitrary nor subjective, but an entirely valid method of reasoning.

Revolutionary though it was for its time,

Kant's philosophy cannot be regarded as a satisfactory solution to the problems posed by it. More than anything, Kant's dialectic resembles the old Socratic dialectic of discussion. There is some merit in this. The struggle between opposed conceptions, in which due weight is given to the arguments of the other side, and arguments are put forward for and against in a rigorous way, can lead to a general increase in awareness of the questions involved. Yet there is something unsatisfactory about it; a kind of agnosticism; the superficial idea that "the truth is never all on one side," and so forth.

Kant's antimonies are only four in

number. It was left to Hegel to point out that, in fact everything contains an "antimony" (contradiction):

"That true and positive meaning of the antimonies is this: that every actual thing involves a coexistence of opposed elements. Consequently to know, or, in other words, to comprehend an object is equivalent to being conscious of it as a concrete unity of opposed determinations." (Ibid, p. 78.)

Kant's merit was to submit the traditional forms of logic to a thoroughgoing criticism. His defect lay in his subjectivist position on the theory of knowledge. This was the source of his

main weaknesses— ambiguity, inconsistency and agnosticism. In failing to make a clean break with the traditional logic, while exposing its limitations, Kant landed himself in all kinds of insoluble contradictions (antimonies), which he left unresolved. The problem of the relation between subject and object (thought and being) was only finally resolved by Marx and Engels, who pointed out that, ultimately, all the problems of philosophy are resolved in practice:

"Social life is essentially practical. All mysteries which mislead theory to mysticism find their rational solution in human practice and in the

comprehension of this practice."
(MESW, Theses on Feuerbach, no. 8,
Vol. 1, p. 15.)

Hegel's Revolution in Philosophy

"For the rest it is not difficult to see that our epoch is a birth-time, and a period of transition. The spirit of man has broken with the old order of things hitherto prevailing, and with the old ways of thinking, and is in the mind to let them sink into the depths of the past and to set about its own transformation. It is indeed never at rest, but carried along the stream of progress ever onward. But it is here as in the case of the birth of a child; after a long period of nutrition in

silence, the continuity of the gradual growth in size, of quantitative change, is suddenly cut short by the first breath drawn—there is a break in the process, a qualitative change—and the child is born. In like manner the spirit of the time, growing slowly and quietly ripe for the new form it is to assume, disintegrates one fragment after another of the structure of its previous world. That it is tottering to its fall is indicated only by symptoms here and there. Frivolity and again ennui, which are spreading in the established order of things, the undefined foreboding of something unknown—all these betoken that there is something else approaching. The gradual crumbling to pieces, which

did not alter the general look and aspect of the whole, is interrupted by the sunrise, which, in a flash and at a single stroke, brings into view the form and structure of the new world." (Hegel, *The Phenomenology of Mind*, p. 75.)

Hegel's "Voyage of Discovery"

Georg Wilhelm Friedrich Hegel was born in Stuttgart in 1770. In his youth he was a follower, and then a collaborator of Schelling, whose radical views gained him a certain notoriety, until he made his peace with the Prussian authorities in later life. But Hegel soon moved on from his early efforts. Hegel's original contribution to philosophy

begins in 1807 with the publication of *The Phenomenology of Mind*. The period under consideration was one of storm and stress. France had erupted in revolution when he was a nineteen year old student. The French Revolution, and the Napoleonic wars set an indelible stamp on the entire epoch. In Hegel's own words, the "composition of the book was concluded at mid-night before the battle of Jena."

This work, which Hegel describes as his "Voyage of discovery" was received with coldness and dissatisfaction by those who had previously been his teachers and friends. The *Phenomenology* traces the development

of thought through all its phases, proceeding from the lowest, most general, and abstract to the highest form which he calls the Notion. Each form of knowledge is examined within his own conditions and limits, bringing out its dialectical relation to other forms of thought. The importance of philosophy is that it alone must consider and justify its own conceptions, unlike mathematics, which proceeds from given axioms which are accepted uncritically. Philosophy presupposes nothing, not even itself.

For the modern reader, the writings of Hegel present considerable difficulties. "Abstract and abstruse," Engels called

them. This is certainly true of The Phenomenology. At times, one has the impression that Hegel is being deliberately obscure, that he is challenging the reader to penetrate the complex and difficult edifice of dialectical thought. A large part of the difficulty, in fact, stems from the fact that Hegel was an idealist, and that, therefore, the dialectic appears here in a mystified form. The Phenomenology is a good example of this.

Here historical development appears in a idealistic fashion, as the development of self conscience mind (or spirit). Nevertheless, it is possible to read Hegel, as Marx did, from a materialist

point of view, bringing out the rational kernel of his thought. In *The Phenomenology* "self consciousness" reveals its activity in many ways, through sensation and perception, as well as through ideas. In all this, it is possible to perceive the dim outline of real processes that take place in nature, society, and the human mind. In contrast with previous idealist philosophies, Hegel displayed a lively interest in the facts of nature, human nature, and human history. Behind his abstract presentation, there lies a wealth of knowledge of all aspects of history, philosophy and contemporary science. Marx described him as "the most encyclopaedic mind of the day."

Behind the "abstract and abstruse" language, once the idealist mystification is stripped away, we see before us a full-fledged revolution in human thought. The Russian radical democrat Herzen referred to the Hegelian dialectic as "the algebra of revolution." In an algebraic equation it is necessary to fill in the missing quantities. This was later achieved by Marx and Engels, who rescued the rational kernel of Hegel's philosophy after his death, and, by placing it on a materialist basis, gave it a scientific character. Commenting on Hegel's philosophy, Engels writes:

"This new German philosophy terminated in the Hegelian system. In this

system—and this is its great merit—the whole world, natural, historical, intellectual, is for the first time represented as a process, i.e., as in constant motion, change, transformation, development; and the attempt was made to show internal interconnections in this motion and development. From this point of view the history of mankind no longer appeared as a wild whirl of senseless deeds of violence, all equally condemnable at the judgement-seat of mature philosophic reason and best forgotten as quickly as possible, but as the process of evolution of humanity itself. It was now the task of the intellect to follow the gradual march of this process through all its devious ways,

and to trace out the inner logic running through all its apparently contingent phenomena." (Engels, *Anti-Dühring*, p. 29.)

Hegel Today

Hegel was a genius who was far ahead of his time. Unfortunately, the level of the natural sciences at the beginning of the 19th century did not furnish enough information to allow him to apply his revolutionary new method to full effect, although he had some brilliant insights, as Ilya Prigogine has pointed out. Engels applied this method to science in *The Dialectics of Nature*, a masterpiece of dialectical writing. But in our own time,

science has furnished a wealth of material which shows the correctness of Hegel's fundamental ideas. It is a tragedy that the 20th century lacked a Hegel to provide the necessary insights into these great discoveries.

Nowadays, many scientists adopt a contemptuous attitude towards philosophy, which they regard as superfluous to their requirements. They consider that the actual progress made by science places them far above philosophy. In reality, however, they are far below philosophy at its most primitive level. It is said that nature abhors a vacuum. In the absence of a consistent and worked-out philosophy,

they fall pray to all kind of prejudices and false ideas which they unconsciously imbibe from the prevailing tendencies and mood in society in which they live. This flotsam and jetsam, together with a few confused recollections of bad philosophy they picked up at university, provide the sum total of the intellectual baggage of many supposedly educated persons, including scientists. As Hegel humorously observed, these are "held to be a good substitute for real philosophy, much in the way that chicory is lauded as a substitute for coffee." (Phenomenology, p. 126.)

For most of this century, Hegel has been

sadly neglected. The dominant school of Western philosophy, logical positivism, which was born partly as a reaction against Hegelianism, has treated Hegel rather as extreme Protestants treat the Pope of Rome. In turn, the views of this philosophical sect has influenced many scientists. One of the very few modern scientists in the West who has been prepared to give Hegel his due is the Belgian Ilya Prigogine, who has developed the theory of chaos and complexity, a line of thinking which has much in common with dialectics. It is a very simple matter to dismiss Hegel (or Engels) because their writings on science were necessarily limited by the actual state of science of the day. What

is remarkable, however, is how advanced Hegel's views on science actually were.

In their book *Order out of Chaos*, Prigogine and Stengers point out that Hegel rejected the mechanistic method of classical Newtonian physics, at a time when Newton's ideas were universally sacrosanct:

"The Hegelian philosophy of nature," write Prigogine and Stengers, "systematically incorporates all that is denied by Newtonian science. In particular, it rests on the qualitative difference between the simple behaviour described by mechanics and the

behaviour of more complex entities such as living beings. It denies the possibility of reducing those levels, rejecting the idea that differences are merely apparent and that nature is basically homogeneous and simple. It affirms the existence of a hierarchy, each level of which presupposes the preceding ones." (Op. cit., p. 89.)

Prigogine and Stengers refer to the unjust neglect from which Hegel has suffered, precisely at a time when his criticisms of Newtonian mechanism had been shown to be correct:

"In a sense Hegel's system provides a consistent philosophic response to the

crucial problems of time and complexity. However, for generations of scientists it represented the epitome of abhorrence and contempt. In a few years, the intrinsic difficulties of Hegel's philosophy of nature were aggravated by the obsolescence of the scientific background on which his system was based, for Hegel, of course, based his rejection of the Newtonian system on the scientific conceptions of his time. And it was precisely those conceptions that were to fall into oblivion with astonishing speed. It is difficult to imagine a less opportune time than the beginning of the nineteenth century for seeking experimental and theoretical support for an alternative to classical

science. Although this time was characterised by a remarkable extension of the experimental scope of science and by a proliferation of theories that seemed to contradict Newtonian science, most of those theories had to be given up only a few years after their appearance." (Ibid., p. 90.)

There are only a couple of things that need to be added to this. Firstly, what was valuable in Hegel's philosophy was not his system, but the dialectical method. Part of the reason why Hegel's writings are obscure is precisely that he tried to force the dialectic—which he developed brilliantly—into the straitjacket of an arbitrary idealist

philosophical system. When it did not fit, he resorted to all manner of subterfuges and peculiar modes of reasoning which make the whole thing extremely convoluted and obscure.

However, we are firmly convinced that the main reason for the shameful conspiracy against Hegel has nothing to do with the obscurity of his style. That did not worry the university professors a hundred years ago. Moreover, the obscurity of Hegel is nothing compared to the senseless linguistic meanderings of the logical positivists, who are held up as models of "coherent thought," though nobody quite knows why. No, the real reason why Hegel became

converted into a non-person is because it was realised that his dialectical philosophy was the point of departure for the revolutionary ideas of Marx and Engels. Poor old Hegel, conservative that he was in real life, has been tried in his absence and found guilty by association.

The fear of Hegel's ideas is neither accidental nor mistaken. Even in the 19th century, the danger posed by the dialectic was clear to some. James Stirling, a prominent English "Hegelian" wrote in 1867:

"This dialectic, it appears to me, has led to much that is equivocal both in Hegel

and in others, and may become a pest yet." (Note to Schwegeler's History of Philosophy, p. 415.)

Even during his lifetime, the revolutionary implications of Hegel's philosophy began to disturb the Prussian authorities. The defeat of the French in 1815 ushered in a period of reaction all over Europe. The so-called Carlsbad decrees of 1819 subjected the universities in all areas under Prussian jurisdiction to inquisitorial control. The slightest non-conformity was looked upon as subversion. A stifling atmosphere of petty provincialism prevailed in the lands of the "cabbage Junkers," as Marx later ironically called

the Prussian feudal aristocrats.

In Berlin, where Hegel taught at the university, spiteful rumours were put in circulation by Hegel's enemies that his ideas were un-Christian, or even downright atheism. From then on he was a marked man. Attacked by both Rationalists and Evangelicals, Hegel defended himself vigorously, pointing out that "all speculative philosophy on religion may be carried to atheism; all depends on who carries it; the particular piety of our times, and the malevolence of demagogues who will not let us want carriers." (Hegel, *Logic*, p. xxxix.)

Such was the atmosphere of persecution

that Hegel even considered moving to Belgium, as Marx later did. In 1827 he wrote a letter to his wife commenting that he had looked at the universities of Liege and Louvain with the feeling that they might one day provide him a resting-place, "when the parsons in Berlin make the Kupfergraben completely intolerable for him." (ibid.) "The Roman Curia," he added, "would be a more honourable opponent than the miserable cabals of a miserable boiling of parsons in Berlin." (ibid.) It is ironical that at the end of his life, the conservative and religious Hegel should be regarded as a dangerous radical. Yet there was more than a grain of truth behind the suspicions of the

reactionaries. Hidden within the philosophy of Hegel was the germ of a revolutionary idea, which would transform the world. This, in itself, constitutes the most remarkable example of a dialectical contradiction!

In his History of Philosophy Hegel revealed the hidden dialectical relationship between different schools of thought, showing how different theories revealed different aspects of the truth, which do not so much contradict, as complement and complete one another. In the Encyclopaedia of the Philosophical Sciences, Hegel likewise attempts to show the whole of science as an integrally collective whole. It is not

merely a collection of sciences or a dictionary of philosophical knowledge but science presented as a dialectically interrelated totality. This is a very modern conception.

Hegel did not set out to deny or demolish previous philosophy, but to summarise all previous schools of thought, and arrive at a dialectical synthesis. But in so doing, he pushed philosophy to its limits. Beyond this point, it was impossible to develop philosophy, without transforming it into something different. It is possible to say that, since Hegel, nothing new has really been said on the main philosophical questions. Subsequent schools of

philosophy, which purport to be new and original merely rehash old ideas, invariably in a more superficial and unsatisfactory manner. The only real revolution in philosophy since Hegel was the one effected by Marx and Engels, which passes beyond the limits of philosophy as a merely intellectual exercise, and carries it into the realm of practice and the struggle to change society.

Hegel says in *The History of Philosophy* that "the being of mind is its act, and its act is to be aware of itself." But in Hegel, thinking is not merely a contemplative activity. The highest form of thought, reason, does not merely

accept the given facts, but works upon them and transform them. The contradiction between thought and being, between "subject" and "object," is overcome in Hegel through the process of knowledge itself, which penetrates ever deeper into the objective world. From a materialist point of view, however, thinking is not a isolated activity, but is inseparable from human existence in general. Mankind develops thought through concrete, sensuous activity, not merely intellectual activity. By transforming the material world through labour, man and women also transforms themselves, and, in so doing, develop and extend the horizon of their thinking. In embryo, the elements of this

dialectical conception is already present in Hegel. What Marx did was to strip it of its idealist disguise, and expresses it in a clear and scientific manner.

Theory of Knowledge

As we have seen, the fundamental problem of philosophy is the relation between thought and being. What is the relation between consciousness (knowledge) and the objective world? Kant claimed that there was an unbridgeable gap between the thinking subject and the unknowable Thing-in-Itself. Hegel poses the question differently. The process of thinking is the unity of subject and object. Thought is

not a barrier separating man from the objective world, but, on the contrary, is a process linking ("mediating") the two. Taking as its starting point the reality immediately given in sense perception, human thought does not merely passively accept, as Locke imagined, but sets to work, transforming this information, breaking it down into its component parts, and putting it together again. Man uses rational thought to go beyond immediate reality. Dialectical thought, in analysing a given phenomenon, divides it into its component parts and demonstrates those contradictory features and tendencies which give it life and movement.

Scientific knowledge does not consist of a mere catalogue of particular items. If we say "all animals," that is not yet zoology. Above and beyond the facts, it is necessary to discover laws and objective processes. It is necessary to uncover the objective relations between things, and explain the transitions between one state and the other. The history of science, like that of philosophy, is a permanent process of affirmation and negation, a ceaseless process and development, in which one idea negates another, and, in its turn, is negated in a never-ending process of deepening man's knowledge of himself and the universe. A similar phenomenon may be seen in the mental development

of the infant.

Hegel's great merit was to show the dialectical character of the development of human thought, from its embryonic phase, passing through a whole series of stages, and finally arriving at the highest stage of reason, the Notion. In Hegelian language, it is the process from being "in itself" to being "in and for itself," that is to say, from undeveloped, implicit being to developed and explicit being. The human embryo, is, potentially, a human being, but it is not a human being in and for itself. In order to realise its full potential, a whole period of development is necessary, in which infancy, adolescent and middle age

constitute necessary stages. The thought of a child evidently has an immature character. But even a correct idea expressed by a youth does not have the same weight as the same idea expressed by an old person, who has experienced life, and consequently has a deeper understanding of what these words actually mean.

In Hegel, the real development of human beings is presented in a mystical form, as the development of spirit. As an idealist, Hegel had no real conception of the development of society, although there are some brilliant anticipations of historical materialism in his writings. Thought appears here as an expression

of the Absolute Idea, a mystical concept about which the only thing we learn, as Engels ironically put it, is that he tells us absolutely nothing about it. In reality, thought is the product of the human brain and nervous system, inseparable from the human body, which, in turn, depends upon food, which, in turn, presupposes human society and productive relations.

Thought is a product of matter that thinks, the highest achievement of nature. Inanimate matter possesses the potential to produce life. Even the lowest forms of life possess sensibility, irritability, which has the potential to produce, in higher animals a nervous system, and a brain. Hegel's "self consciousness" is merely a

fantastic way of expressing the historical process by which real human beings gradually become conscious of themselves and the world in which they live. This does not come about easily or automatically, any more than the individual human being automatically acquires consciousness in the transition from infancy to adulthood. In both cases, the process takes place through a prolonged and often traumatic series of stages. The development of human thought, as reflected in the history of philosophy and science, and of culture in general, reveals itself as a contradictory process, in which one stage supersedes another, and, in its turn, is superseded. It is not a straight line, but one that is

continuously interrupted, with periods of stagnation, faltering and even reversals, which, however, merely prepares the ground for new advances.

How Thought Develops

The very beginnings of human thought, mind in its immediate and primitive stage, is sense perception: primitive man, through his senses, begins by registering and memorising the data immediately provided by his environment, without understanding the true nature, causal relationships, and laws which underlie them. From observation and experience, gradually the human mind proceeds to make a

number of generalisations of a more or less abstract character. This process involves a long and laborious journey lasting several millions of years, extremely slow at first, but rapidly gathering momentum in the last ten thousand years. Yet despite the colossal strides made by thought and science, ordinary thinking remains on quite a primitive level.

When we first consider any subject, we first form a notion of the whole, without grasping all the concrete content and detailed interconnections. It is merely a general outline and a bare abstraction. Thus, the Ionic philosophers and even Buddhism intuitively grasped the

universe as a constantly changing dialectical whole. But this initial notion lacks all definition and concreteness. It is necessary to go further and provide the general picture with a definite expression, analysing and specifying the precise relations of its content. It has to be analysed and quantified. Without this, science in general is impossible. This is the difference between crude, immediate, undeveloped thought and science as such.

At the dawn of human consciousness, men and women did not clearly distinguish themselves from nature, just as a new-born baby does not distinguish itself from its mother. Gradually, over a

long period, humans learned to distinguish, to cognize the world, by detecting focal points in the bewildering web of natural phenomena surrounding them, to observe, compare, generalise, and draw conclusions. In this way, over countless millennia, a series of important generalisations were built up from experience, which gradually came to crystallise into the familiar forms of thought which, because we are so familiar with them, we take for granted.

Common, everyday thought relies heavily on sense perception, immediate experience, appearances, and that peculiar hybrid of experience and superficial thinking called "common

sense." These things are normally sufficient to carry us through life. But they are insufficient to arrive at a scientific understanding, and, at a certain point, break down and become useless even for practical purposes. It is necessary to go beyond the immediate experience of sense perception, and to grasp the general processes, laws and hidden relations which lie beyond frequently deceptive appearance.

Ordinary human thought prefers to cling to what is concrete and familiar. It is easier to accept what is apparently fixed and well known rather than new ideas which challenge what is familiar and customary. Routine, tradition, custom

and social convention represent a powerful force in society, akin to the force of inertia in mechanics. In normal periods most people are reluctant to question the society in which they live, its morality, ideology and property forms. All kind of prejudices, political ideas, "scientific" orthodoxy are accepted uncritically, until some profound change in people's life force them to question what is.

Social and intellectual conformism is the commonest form of self deception. Familiar ideas are taken to be correct just because they are familiar. Thus, the notion that private property, money and the bourgeois family are eternal and

unchanging features of life has sunk deeply into the popular consciousness, although it bares no relation whatsoever to the truth. Dialectics is the direct opposite of this superficial and commonplace way of thinking. Precisely because it challenges familiar ideas, it frequently arouses fierce opposition. How is it possible, to challenge the law of identity, which states what seems obvious, that "A equals A"? This so-called law is the logical reflection of a popular prejudice, that everything is what it is, and nothing else; that nothing changes. Dialectics, on the contrary, sets out from the opposite point of view, that everything changes, comes into being and passes away.

The empiricist thinker, who claims to take things "as they are," imagines himself to be very practical and concrete. But, in reality, things are not always what they seem to be, and frequently turn out to be their opposite. This kind of immediate sensuous knowledge is the lowest kind of knowledge, like that of a baby. A really scientific understanding of reality requires us to break down the information provided by sense perception in order to get at the true nature of the things under consideration. A deeper analysis always reveals the contradictory tendencies which underlie even the most apparently fixed, solid, and immutable things, which eventually

will lead to them being transform into their opposites. It is precisely these contradictions which are the source of all life, movement and development throughout nature. In order to get a real understanding, it is necessary to take things, not just as they are, but also as they have been, and as they necessarily will become.

For simple everyday purposes, formal logic and "common sense" is sufficient. But beyond certain limits it no longer applies. At this point dialectics become absolutely essential. Unlike formal logic, which cannot grasp contradictions and seeks to eliminate them, dialectics represents the logic of contradiction,

which is a fundamental aspect of nature and thought. By a process of analysis, dialectics reveals these contradictions and shows how they are resolved.

However, new contradictions always appear, thus giving rise to a never-ending spiral of development. This process can be seen in the entire development of science and philosophy, which takes place through contradictions. This is not an accident. It reflects the nature of human knowledge as an infinite process in which the solution of one problem immediately give rise to new ones, which are in turn resolved, and so on ad infinitum.

If we set out from the most elementary

form of knowledge at the level of sense-experience, the limitations of formal logic and "common sense" very soon become clear. The mind simply registers the facts as we find them. At first sight, the truths of sense perception seem to be simple and self evident. They can be confidently relied upon but on closer examination, things are not so simple. What appears to be solid and reliable turns out not to be so. The ground begins to shift beneath our feet.

Sense-certainty sets out from the "here" and the "now." Of this Hegel says: "Sense-certainty itself has thus to be asked: What is the This? If we take it in the two-fold form of its existence, as the

Now and as the Here, the dialectic it has in it will take a form as intelligible as the This itself. To the question, What is the Now? we reply, for example, the Now is night-time. To test the truth of this certainty of sense, a simple experiment is all we need: write that truth down. A truth cannot lose anything by being written down, and just as little by our preserving and keeping it. If we look again at the truth we have written down, look at it now, at this noon-time, we shall have to say it has turned stale and become out of date." (Op. cit., p. 151.)

This comment of Hegel recalls the famous paradoxes of Zeno in relation to

motion. For example, if we wish to fix the position of an arrow flying, to say where it is now, the moment that we point to it, it has already passed, and therefore the "now" is not something that is, but something that has been. Thus, what initially appear to be true, turns out to be false. The reason is to be found in the contradictory nature of movement itself. Movement is a process, not a collection of separate points. Similarly, time consists of an infinite number of "nows," all taken together. Likewise the "here" turns out to be not a single "here," but a before and a behind, and an above and a below, and a right and a left. What is here, as a tree, the next minute is here as a house, or something else.

Dialectical and Formal Thinking

The correct application of the dialectical method means that the investigator must completely immerse himself in the study of the object, examining it from all sides in order to determine the inner contradictions and necessary laws of motion which governs its existence. The classical example of this method is to be found in the three volumes of Marx's Capital. Marx did not invent the laws which govern the capitalist mode of production in an arbitrary fashion, but derived them from a painstaking dialectical analysis of all aspects of capitalism, tracing its historical development and following the process

of commodity production through all its phases.

In his Philosophical Notebooks, which contain a detailed study of Hegel's Science of Logic, Lenin points out that the first condition for dialectical thought is "the determination of the concept out of itself (the thing itself must be considered in its relations and in its development)." Or, put another way, the dialectical method sets out from "the absolute objectivity of consideration, (not examples, not divergences, but the Thing-in-Itself)." (Lenin, Collected Works, Vol. 38, p. 221.)

The first and lowest form of thought is

sense-perception, that is to say, the information immediately given to us by our senses—what we see, hear, touch, etc. This is followed by understanding (Verstand), which attempts to explain what is, but does so in a one-sided way, registering isolated facts. Broadly speaking, the understanding here is identical with formal logic, ordinary thinking, and "common sense." We see that a thing exists, that it is itself, and nothing but itself. There seems nothing more to be said. But, in reality, there is a great deal more to be said. The understanding presents things as isolated, fixed and unchanging. Reality, however, is not like that at all.

A more advanced form of thinking is what Hegel (and Kant) call Reason (Vernunft). Reason attempts to go beyond the immediate facts established by understanding, to break them down, dissolve them, and behind the apparently solid exterior appearances, to reveal the inner contradictory tendencies, which, sooner or later, will lead to profound transformations. "The battle of reason," says Hegel, "is the struggle to break up the rigidity to which the understanding has reduced everything." (Hegel, Logic, p. 53.)

The first principle of dialectical thought is absolute objectivity. The subject matter must be approached objectively,

and the final result must not be anticipated in advance. We must absorb ourselves in the subject matter, until we grasp not just a series of isolated facts, but their inner connection and lawfulness. The laws of dialectics, unlike formal logic are not arbitrary constructions which can be applied in an external manner to any particular content. They have been derived from a careful observation of the development of nature, society and human thought.

The usual forms of thought represented by formal logic can be applied to any subject matter in an external and arbitrary fashion. Indeed, the real content of the subject matter is entirely

irrelevant to it. Formal logic, as expressed in the abstract law of identity (A equals A) appears to express an indisputable truth. In reality, it is an empty tautology, "monochrome formalism," or as Hegel says wittily, "the night in which all cows are black—that is the very na·vety of emptiness of knowledge." (Hegel, *Phenomenology*, p. 79.)

The so-called law of identity is only an abstract form with no real content, incapable of movement or further development. It cannot be applied to the dynamic reality of a restless universe, in which everything constantly changes, comes into being, and passes away, and

therefore cannot be considered self-equal. In the same way, the law of contradiction is false because every really existing thing contains both positive and negative. It is and it is not because it is in a constant state of movement and change. The only thing which does not change is change itself. All attempts to fix the truth as a one-sided and static thing is doomed to failure. As Hegel wittily expressed it, the truth is "bacchanalian revel." The existence of contradiction is reflected intuitively in the popular consciousness in the form of proverbs and sayings which, however, because of their unsystematic and intuitive character, often contradict each other. For example,

"One man's meat is another man's poison."

In science also we see contradictions at all levels, for example attraction and repulsion, North and South in magnetism, positive and negative in electricity, action and reaction in mechanics, contraction and expansion, etc. As against formal logic, dialectics does not inflict itself on nature, but derives its categories from reality itself. Real dialectics has nothing in common with the caricature outlined by its critics, who try to present it as a subjective and arbitrary play on words. This is really the dialectic of Sophism, which, like formal logic, is also applied

in an external manner to any given content with the intention of manipulating contradictions in a subjective manner. Nor does dialectics have anything in common with the gross oversimplification of the "triad" (thesis, antithesis, synthesis), which was adopted by Kant and turned into a lifeless formulae. Real dialectics attempts to discover, by means of a rigorously objective analysis, the inner logic and laws of motion of a given phenomenon.

Hegel's Logic

The Logic of Hegel is one of the pinnacles of human thought. It is the

systematic exposition and development of all the forms of thought, from the more primitive undeveloped thought, up to the highest form of dialectical reasoning, which Hegel calls the Notion.

He sets out with the most general proposition possible—that of "pure being"—something that seems to require no further proof. From this extremely abstract idea, he proceeds, step by step, along a process which leads from the abstract to the concrete.

This process of reasoning proceeds by stages, in which each stage negates the previous one. The history of thought, particularly that of philosophy and

science, shows that knowledge is acquired precisely in this way, in a never-ending process whereby we obtain an increasingly precise idea of the workings of the universe. In Hegel, each stage is no sooner affirmed than it is negated, and the result is a higher, richer, more concrete idea.

In general outline, Hegel's Logic can be divided into three main parts: The Doctrine of Being, The Doctrine of Essence (essential nature) and the Doctrine of the Notion.

Hegel begins his philosophy with the most fundamental category of thought—the category of Being. Evidently,

anything which we consider must exist, before anything else. This seems to be the basis of all our knowledge. But things are not so simple as that. The bare statement of existence, without further details, does not get us very far. We want to know more. But the moment we pass from the abstract idea of being in general to a more concrete idea, being turns into its opposite. Hegel shows that being in general is the same as—nothing.

This idea seems strange, but actually can be seen to be true on many different levels. If we try to eliminate all contradiction from things, and cling to the idea that they just are, we arrive at the opposite conclusion, because there

can be no being without not-being, just as there can be no life without death, and no light without darkness. People who have spent a long time in the Arctic know that the effect of unrelieved whiteness is the same as that of total blackness to the human vision.

It is, in fact, an empty abstraction, since it lacks all concreteness. In reality, the dialectical unity of being and nothing is becoming. This is what Heraclitus meant when he said "everything is and is not, because everything is in flux." Everyone knows from experience that things are frequently not what they seem to be. Things that appear to be stable, so that we can say "they are," on closer

examination turn out to be unstable, and change into something else, and they "are not." Moreover, this contradiction between being and not being is the basis of all life and movement.

In Hegel, the category of being represents the stage of primitive, undeveloped thought. It is thought only as a potential, like the thought of a small child, or early proto-humans. It is embryonic thought. An embryo begins as a single cell, with no clearly developed features. It is not clearly identifiable as a human being. In order to develop, it must first negate itself. Inside the cell, there are contradictory tendencies which give rise to a process of inner differentiation.

When these conflicting tendencies reach a certain point, the cell divides in two. The original, undifferentiated cell has ceased to exist. It has been cancelled, negated. Yet at the same time, it has been preserved, and carried onto a higher level. The process is repeated many times, giving rise to increasing organisation, and greater complexity, with more clearly distinguishable features, eventually giving rise to a fully-fledged human being.

The point is that, in real life, the negative side of things is equally as important as the positive. We are accustomed to look upon life and death as completely opposite poles. But in

practice, they are two parts of the same process, and are inseparable. The process of life, growth and development can only take place through the constant renewal of all the cells of the organism, some dying, others coming into being. Even on the most primitive level, life involves constant change in which the organism constantly absorbs food from its surroundings and uses it to build itself, while getting rid of waste matter. Therefore, every living thing is and is not at the same time, because everything is in a constant state of flux. To be without contradiction is to lack all inner differentiation, to have no movement, to be in a state of static equilibrium—in a word, to be dead.

In the words of Prigogine and Stengers:

"The living cell presents an incessant metabolic activity. There thousands of chemical reactions take place simultaneously to transform the matter the cell feeds on, to synthesise the fundamental biomolecules, and to eliminate waste products. As regards both the different reaction rates and the reaction sites within the cell, this chemical activity is highly coordinated. The biological structure thus combines order and activity. In contrast, an equilibrium state remains inert even though it may be structured, as, for example, with a crystal." (Prigogine and Stengers, *Order out of Chaos*, p. 131.)

At first sight, these observations may seem like pointless subtleties. In point of fact, they are extremely profound reflections, which are not only applicable to thought, but also to nature. And, although it is not always obvious, the same is true of inanimate nature also. Indeed, Hegel considered that the two were inseparably linked. "Everything flows and nothing stays," said Heraclitus. "You can't step twice into the same river." Hegel here is saying the same thing. At the heart of this philosophy is a dynamic view of the universe; a view which deals with things as living processes, not dead objects; in their essential interrelations, not separate bits and pieces, or arbitrary

lists; as a whole, which is greater than the sum of the parts.

Quantity and Quality

Everything can be seen from two points of view—quality and quantity. The fact that the world consists of a sum total of processes which are constantly changing does not mean that real things do not have a definite form of existence, an identity. However much an object changes, it remains, within certain limits, a qualitatively distinct form of existence, different from another. It is this qualitative definiteness which gives things stability, differentiates them, and makes the world so rich and boundlessly

varied.

The properties of a thing are what make it what it is. But this quality is not reducible to its separate properties. It is bound up with the object as a whole. Thus, a human being is not just an assemblage of bone tissue, blood, muscles, etc. Life itself is a complex phenomenon which cannot be reduced to the sum total of its individual molecules, but arises from the interactions between them. To use the modern terminology of complexity theory, life is an emergent phenomenon.

The relation of whole and parts was dealt with at length by Hegel, who

wrote: "The limbs and organs, for instance, of an organic body are not merely parts of it: it is only in their unity that they are what they are, and they are unquestionably affected by that unity, as they also in turn affect it. These limbs and organs become mere parts, only when they pass under the hands of the anatomist, whose occupation, be it remembered, is not with the living body but with the corpse. Not that such analysis is illegitimate: we only mean that the external and mechanical relation of whole and parts is not sufficient for us, if we want to study organic life in its truth." (Hegel, Logic, p. 191-2.)

It is interesting to note that the latest

ideas which have caught the imagination of an important section of the scientific community—the theories of chaos and complexity—were anticipated long ago by Hegel, and, in many respects, received a much more comprehensive treatment in his hands. A case in point is his explanation of the transformation of quantity into quality, whereby an accumulation of small changes brings about a sudden change in quality.

In addition to the quality which defines the essential features of an object, all things possess quantitative features—a definite magnitude, number, volume, speed of its processes, degree of development of its properties, and so on.

The quantitative side of things is that which permits them to be divided (actually or mentally) into their constituent parts and put together again. In contrast to quality, changes in quantity do not alter the nature of the whole, or cause its destruction. Only when a definite limit is reached, which is different in each case, do changes of quantitative character cause a sudden qualitative transformation.

In mathematics, the quantitative aspect of things is separated from their content and regarded as something independent. The extremely wide field of applicability of mathematics to spheres of natural science and technology with very

different contents is explained by the fact that it deals purely with quantitative relations. Here, it is claimed, it is impossible to reduce quality to quantity. This is the fundamental error of which Marx and Engels referred to as the Metaphysical mode of thought, and which nowadays is termed reductionism. There is nothing in the real world that consists only of quantity, just as there is nothing which is pure quality. Everything in reality consists of the unity of quantity and quality, which Hegel called Measure.

Measure is the organic unity of quantity and quality. Every qualitatively distinct object, as we have seen, contains

quantitative elements which are mobile and variable. Living organisms grow at a certain rate. Gases and liquids are affected by variations in temperature. The behaviour of a water droplet or a heap of sand is determined by its size, and so on. These mutations, however, are necessarily bounded by definite limits, which are different in each case, but in practice can usually be discovered. Carried beyond this limit, quantitative changes bring about a qualitative transformation. In its turn, the qualitative change brings about a change in its quantitative attributes. There are not only changes of quantity to quality, but also the opposite process, where a change in quality causes a change in

quantity. The critical points of transition from one state to another are expressed as nodal points in Hegel's nodal line of measurement.

Essence

The Doctrine of Essence is the most important part of Hegel's philosophy, because it is here that he explains the dialectic in detail. Human thought does not stop at what is immediately given in sense perception, but seeks to go beyond it and grasp the thing-in-itself. Beyond appearance, we look for the essence of a thing. But this is not immediately accessible. We can see the sun and moon, but we cannot "see" the laws of

gravity. In order to go beyond appearance, the mind must be actively brought into play, to break down what we earlier learned through understanding. If the understanding is positive, asserting that a given thing "is," dialectical reasoning is essentially negative, in that it dissolves what "is," and reveals the inner contradictions, which will inevitably destroy it.

The contradiction which lies at the heart of all things is expressed as the idea of the unity of opposites. Dialectically, what seem to be mutually exclusive phenomena are actually inseparable, as Hegel explains:

"Positive and negative are supposed to express an absolute difference. The two however are at bottom the same: the name of either might be transferred to the other. Thus, for example, debts and assets are not two particular, self-subsisting species of property. What is negative to the debtor is positive to the creditor. A way to the east is also a way to the west. Positive and negative are therefore intrinsically conditioned by one another, and are only in relation to each other. The north pole of the magnet cannot be without the south pole, and vice versa. If we cut a magnet in two, we have not a north pole in one piece, and a south pole in the other. Similarly, in electricity, the positive and the

negative are not two diverse and independent fluids." (Hegel, Logic, p. 173.)

In the process of analysis, Hegel enumerates a series of important stages: positive and negative; necessity and accident; quantity and quality; form and content; action and repulsion; and so on. One of the central features of Essence is that it is relative—everything is related to something else, in a universal web of interaction. The basic law of elementary knowledge (understanding) is the law of identity (" $A = A$ "). This is generally considered as the basis of all that we know. Up to a point, this is correct. Without the law of identity, coherent

thought would be impossible. We ascertain the basic fact of existence, and focus our attention on a particular thing. However, identity presupposes difference. A cat is a cat, because it is not a dog, a mouse, an elephant, and so on. In order to establish identity, we must compare something to another.

In real life, nothing is purely itself, as implied by the law of identity, despite its apparently absolute character.

Everything is determined by everything else. In that sense everything is relative. As Engels remarks: "The true nature of the determinations of 'essence' is expressed by Hegel himself (Enzyklopödie, I, paragraph 111,

addendum): 'In essence everything is relative' (e.g., positive and negative, which have meaning only in their relation, not each for itself)." (Engels, *Dialectics of Nature*, p. 283.)

Not only that. Nothing is simple, as also implied in the law of identity. As we saw in relation to the simple cell or embryo, concrete being, as opposed to the purely abstract being of mere "identity," must contain inner differentiation. Moreover, this differentiation contains the seeds of contradiction. In order to develop, in order to live, the cell must contain the tendency toward self-dissolution, towards division, towards negation.

This inner tension is, in fact, the basis of all life. But it is also found in non-living objects, for example, the phenomenon of surface tension in a drop of water, which holds the molecules in a certain order, and innumerable other examples.

The attempt to banish contradiction from thought has been an obsession of logicians for centuries. Hegel was the first one to show that, in fact, contradiction lies at the heart of everything that really exists. If we attempt to think of the world without contradiction, as traditional formal logic tries to do, all that we achieve is to introduce insoluble contradictions into thought. This was the real meaning of

Kant's "antimonies." To separate identity and difference, to attempt to deny the existence of contradiction, leads thought into a barren and empty formalism.

Appearance and Essence

Most people realise that "appearances are deceptive." However, this is only relatively true. In order to arrive at an understanding of the essence of a thing, we must begin by a thorough acquaintance with precisely these "appearances," that is, with all the physical features, properties and tendencies we can observe. In the course of such an analysis, it will become clear that certain facts can be omitted as

"unessential," and, gradually, we will arrive at the most fundamental characteristics of the object under consideration.

It is very common to say about somebody "yes, but he's not really like that." The implication is that people are not what they seem to be. Appearance is one thing, but essence is supposed to be completely different. However, this is not quite true. If we only have a slight acquaintance with a person, then it is true that we cannot form an accurate impression of him or her on the basis of their conduct. It may be completely untypical. But if we have known people for a long time, we have sufficient

reason to believe that we know them as they are. We precisely base ourselves on "appearances" because there is nothing else to base ourselves on. The Bible says "by their fruits shall you know them," and that is correct. As a man or woman lives and acts, so they are. There is nothing else to look for.

This was the fundamental error of Kant, when he tried to draw a line between appearances and some mysterious "thing" that lay beyond experience which was supposed to be forever beyond human knowledge. In fact, once we know all the properties of a thing, we know the thing itself. We may be limited at any given moment in time by lack of

information, but, in principle, there is nothing which is forever barred to human knowledge, except one thing—to know everything about an infinite universe. This is no real limitation, but simply an expression of the dialectical relation between the finite nature of individuals, and an infinite universe, which is constantly revealing new secrets. And although the particular knowledge of one person is finite, from one generation to another, the sum-total of knowledge and understanding of humanity increases. The process of learning is never-ending. Precisely in this lies its fascination and its beauty.

We set out from what is known, in order

to discover what is not known. One thing leads to another. A doctor, basing himself on all his knowledge of medical science and past experience, carefully examines all the available symptoms and arrives at a diagnosis. A sailor will study the wind and tides in order to guess the possibilities of putting to sea. In this way, essence is manifested through appearance, although it requires a certain skill and understanding to pass from the one to the other.

One of the greatest errors it is possible to commit when dealing with the processes that occur in society is to approach them as static and fixed, that is to say, from the standpoint of formal

logic. One frequently comes across this kind of thing—narrow-minded prejudice masquerading as "practical wisdom." It is said that "people will never change," "things will always be as they are," and "there is nothing new under the sun." This kind of superficial thought pretends to be profound, but really only reveals the kind of ignorance which is content with itself. No rational reason is given for such assertions. Occasionally an attempt is made to give it a biological basis, with vague references to something called "human nature," from which we instantly deduce that the individual in question knows nothing whatsoever about humans or their nature.

This kind of mentality is strictly limited to its own narrow experience of the world of appearance in the most superficial sense. It is very like a man who is constantly skating on the surface, without bothering to inquire about the thickness of the ice. Such a person may get away with it nine times out of ten. One day, however, he finds himself drowning in icy water. At that precise moment, he begins to realise that maybe the ice was not as solid as it looked.

"A is A." You are you. I am myself. People are people. A peseta is a peseta. Society is society. The trade unions are the trade unions. Such sentences seem reassuring, but in fact are empty of all

content. Insofar as they express anything at all, it is the idea that everything is itself, and nothing changes. However, experience tells us something different. Things are constantly changing, and, at a critical point, small quantitative changes can produce massive transformations.

Form and Content

There are many contradictions in things. For instance, the contradiction between form and content. Every gardener knows that a seed carefully planted in a pot will produce a plant. Initially, the pot protects the young plant and helps it to thrive. But at a certain stage, the roots become too big for the space allowed.

The gardener must remove it from the pot, or it will die. Similarly, the human embryo is protected by the mother's womb for nine months. At this point, a critical stage is reached in which, either the baby is separated from the mother's body, or both will perish. These are examples of the contradiction between form and content which are readily understood. Another example would be the way in which the forces which accumulate beneath the earth's crust eventually produce an earthquake.

Similar forces build up within society, which also has its "fault-lines." The action of these forces is no more visible than those that cause an earthquake. To

the superficial observer, nothing is happening. Everything is "normal." The skilled observer, however, is able to detect the symptoms of subterranean activity in society, just as a competent geologist can read a seismograph. Trotsky once defined theory as "the superiority of foresight over astonishment." It is the fate of superficial and empirical thought to be constantly astonished, like the man who fell through the ice. It is the price one pays for confusing appearance with essence and form with content.

The essence of a thing is the sum total of its most fundamental properties. The task of dialectical analysis is to determine

these. In each case it will be found that there is a potential contradiction between the present state and tendencies which are tending to dissolve it. In classical mechanics, the idea of a perfect equilibrium plays a central role. Things tend to return to equilibrium. That is, at least, in theory. In real life, a perfect equilibrium is a rarity. Whenever equilibrium is reached, it tends to be temporary and unstable. Development and change presupposes this. In the intensive ward of a hospital, "equilibrium" signifies death.

When referring to the properties of a thing, it is customary to use the verb "to have." (Fire has the property of burning;

a human being has the properties of breathing, thinking, eating, etc.) This gives a wrong idea. A child has an ice-cream. A woman has a dog. The relationship here is accidental and external, since the child and the woman could equally well not have these things, and still be a child and a woman. A thing does not "have" properties. It is the sum-total of its properties. Take these away, and we are left with nothing, which is what Kant's Thing-in-Itself really was. This is an extremely important idea, which is only now beginning to be understood by scientists. The whole cannot be reduced to the sum of its parts, because in entering into a dynamic relationship, the parts themselves

become transformed, and give rise to an entirely new situation, governed by qualitatively different laws.

This phenomenon can be seen in society. Trotsky pointed out that the working class, without organisation, is only "raw material for exploitation." This fact is starkly revealed in periods like the present, when trade unions are eliminated or undermined in many workplaces. Historically, the movement of the workers to organise themselves brings about a complete transformation of the situation. Quantity becomes transformed into quality. Whereas individual workers are powerless, the class organised as a class has colossal

power, at least potentially. Not a wheel turns, not a telephone rings, not a light bulb shines without the kind permission of the working class. In Hegelian language, the working class before it is organised, is only a class "in itself" (that is, an unrealised potential). Once it becomes organised and conscious of its power, it becomes a class "for itself." Of course, Hegel was far from drawing such explicitly revolutionary conclusions from his dialectical method. Being an idealist, his main concern was to present the dialectic as the process of development of the Spirit. Real relations are stood on their head, and the real world is presented in a mystified form. But the real content constantly finds its

way through the dense fog of idealism, like shafts of sunlight through the clouds.

In essence, as Engels pointed out, everything is relative. Things are what they are thanks to their interrelations with other things. This also can be seen in society. Things which are commonly believed to be real entities are, in fact, the product of particular relationships, which have sunk so deeply into people's consciousness that they acquire the force of prejudice. Such a thing is the institution of monarchy:

"Na·ve minds," Trotsky observed, "think that the office of kingship lodges in the king himself, in his ermine cloak and his

crown, in his flesh and bones. As a matter of fact, the office of kingship is an interrelation between people. The king is king only because the interests and prejudices of millions of people are refracted through his person. When the flood of development sweeps away these interrelations, then the king appears to be only a washed-out man with a flabby lower lip. He who was once called Alfonso XIII could discourse upon this from fresh impressions.

"The leader by will of the people differs from the leader by will of God in that the former is compelled to clear the road for himself or, at any rate, to assist the

conjuncture of events in discovering him. Nevertheless, the leader is always a relation between people, the individual supply to meet the collective demand. The controversy over Hitler's personality becomes the sharper the more the secret of his success is sought in himself. In the meantime, another political figure would be difficult to find that is in the same measure the focus of anonymous historic forces. Not every exasperated petty bourgeois could have become Hitler, but a particle of Hitler is lodged in every exasperated petty bourgeois." (Trotsky, *The Struggle Against Fascism in Germany*, p. 399.)

Necessity and Accident

In further analysing the nature of being in all its different manifestations, Hegel deals with the relation between potential and actual, and also between necessity and accident ("contingency"). We shall return to the question of necessity and accident later on, as it has occupied a central role in modern science, and is still a highly controversial subject. In relation to this question, it is important to clarify one of Hegel's most famous (or notorious) sayings: "What is rational is actual, and what is actual is rational." (Hegel, *Philosophy of Right*, p. 10.) At first sight, this statement seems mystifying, and also reactionary, since it seems to imply that all that exists is rational, and therefore justified. This,

however, was not at all what Hegel meant, as Engels explains:

"Now, according to Hegel, reality is, however, in no way an attribute predicable of any given state of affairs, social or political, in all circumstances and at all times. On the contrary. The Roman Republic was real, but so was the Roman Empire, which superseded it. In 1789 the French monarchy had become so unreal, that is to say, so robbed of all necessity, so irrational, that it had to be destroyed by the Great Revolution, of which Hegel always speaks with the greatest enthusiasm. In this case, therefore, the monarchy was the unreal and the revolution the real.

And so, in the course of development, all that was previously real becomes unreal, loses its necessity, its right of existence, its rationality. And in the place of moribund reality comes a new, viable reality—peacefully if the old has enough intelligence to go to its death without a struggle; forcibly if it resists this necessity. Thus the Hegelian proposition turns into its opposite through Hegelian dialectics itself: All that is real in the sphere of human history becomes irrational in the process of time, is therefore irrational by its very destination, is tainted beforehand with irrationality; and everything which is rational in the minds of men is destined to become real, however much it may

contradict existing apparent reality. In accordance with all the rules of the Hegelian method of thought, the proposition of the rationality of everything which is real resolves itself into the other proposition: All that exists deserves to perish." (MESW, Vol. 3, pp. 338-9.)

A given form of society is "rational" to the degree that it achieves its purpose, that is, that it develops the productive forces, raises the cultural level, and thus advances human progress. Once it fails to do this, it enters into contradiction with itself, that is, it becomes irrational and unreal, and no longer has any right to exist. Thus, even in the most apparently

reactionary utterances of Hegel, there is hidden a revolutionary idea.

All that exists evidently does so of necessity. But not everything can exist. Potential existence is not yet actual existence. In *The Science of Logic*, Hegel carefully traces the process whereby something passes from a state of being merely possible to the point where possibility becomes probability, and the latter becomes inevitable ("necessity"). In view of the colossal confusion that has arisen in modern science around the issue of "probability," a study of Hegel's thorough and profound treatment of this subject is highly instructive.

Possibility and actuality denote the dialectical development of the real world and the various stages in the emergence and development of objects. A thing which exists in potential contains within itself the objective tendency of development, or at least the absence of conditions which would preclude its coming into being. However, there is a difference between abstract possibility and real potential, and the two things are frequently confused. Abstract or formal possibility merely expresses the absence of any conditions that might exclude a particular phenomenon, but it does not assume the presence of conditions which would make its appearance inevitable.

This leads to endless confusion, and is actually a kind of trick which serves to justify all kinds of absurd and arbitrary ideas. For example, it is said that if a monkey were allowed to hammer away at a typewriter for long enough, it would eventually produce one of Shakespeare's sonnets. This objective seems too modest. Why only one sonnet? Why not the collected works of Shakespeare? Indeed, why not the whole of world literature, with the theory of relativity and Beethoven's symphonies thrown in for good measure? The bare assertion that it is "statistically possible" does not take us a single step further. The complex processes of nature, society and human thought are not all susceptible to

simple statistical treatment, nor will great works of literature emerge out of mere accident, no matter how long we wait for our monkey to deliver the goods.

In order for potential to become actual, a particular concatenation of circumstances is required. Moreover, this is not a simple, linear process, but a dialectical one, in which an accumulation of small quantitative changes eventually produces a qualitative leap. Real, as opposed to abstract, possibility implies the presence of all the necessary factors out of which the potential will lose its character of provisionality, and become actual. And,

as Hegel explains, it will remain actual only for as long as these conditions exist, and no longer. This is true whether we are referring to the life of an individual, a given socioeconomic form, a scientific theory, or any natural phenomenon. The point at which a change becomes inevitable can be determined by the method invented by Hegel and known as the "nodal line of measurement." If we regard any process as a line, it will be seen that there are specific points ("nodal points") on the line of development, where the process experiences a sudden acceleration, or qualitative leap.

It is easy to identify cause and effect in

isolated cases, as when one hits a ball with a bat. But in a wider sense, the notion of causality becomes far more complicated. Individual causes and effects become lost in a vast ocean of interaction, where cause becomes transformed into effect and vice versa. Just try tracing back even the simplest event to its "ultimate causes" and you will see that eternity will not be long enough to do it. There will always be some new cause, and that in turn will have to be explained, and so on ad infinitum. This paradox has entered the popular consciousness in such sayings as this one:

For the want of a nail, a shoe was lost;

For the want of a shoe, a horse was lost;
For the want of a horse, a rider was lost;
For the want of a rider, a battle was lost;
For the want of a battle, a kingdom was
lost;
...And all for the want of a nail.

The impossibility of establishing a "final cause" has led some people to abandon the idea of cause altogether. Everything is considered to be random and accidental. In the 20th century this position has been adopted, at least in theory, by a large number of scientists on the basis of an incorrect interpretation of the results of quantum physics, particularly the philosophical positions of Werner Heisenberg. We shall return to

this later. Suffice it to say that Hegel answered these arguments in advance, when he explained the dialectical relation between accident and necessity.

Hegel explains that there is no such thing as true causality, in the sense of an isolated cause and effect. Every effect has a counter-effect, and every action has a counter-action. The idea of an isolated cause and effect is an abstraction taken from classical Newtonian physics, which Hegel was highly critical of, although it enjoyed tremendous prestige at that time. Here again, Hegel was in advance of his time. Instead of the action-reaction of mechanics, he advanced the notion of

Reciprocity, of universal interaction. Everything influences everything else, and is in turn, influenced and determined by everything. Hegel thus re-introduced the concept of accident which had been rigorously banned from science by the mechanist philosophy of Newton and Laplace.

At first sight, we seem to be lost in a vast number of accidents. But this confusion is only apparent. Order emerges out of chaos. The accidental phenomena which constantly flash in and out of existence, like the waves on the face of an ocean, express a deeper process, which is not accidental but necessary. At a decisive point, this

necessity reveals itself through accident.

This idea of the dialectical unity of necessity and accident may seem strange, but it is strikingly confirmed by a whole series of observations from the most varied fields of science and society. The mechanism of natural selection in the theory of evolution is the best-known example. But there are many others. In the last few years, there have been many discoveries in the field of chaos and complexity theory which precisely detail how "order arises out of chaos," which is exactly what Hegel worked out one and a half centuries earlier.

"Classical" chemical reactions are seen as very random processes. The molecules involved are evenly distributed in space, and their spread is distributed "normally" i.e., in a Gauss curve. These kinds of reaction fit into the concept of Boltzmann, wherein all side-chains of the reaction will fade out and the reaction will end up in a stable reaction, an immobile equilibrium. However, in recent decades chemical reactions were discovered that deviate from this ideal and simplified concept. They are known under the common name of "chemical clocks." The most famous examples are the Belousov-Zhabotinsky reaction, and the Brussels model devised by Ilya Prigogine.

Linear thermodynamics describes a stable, predictable behaviour of systems that tend towards the minimum level of activity possible. However, when the thermodynamic forces acting on a system reach the point where the linear region is exceeded, stability can no longer be assumed. Turbulence arises. For a long time turbulence was regarded as a synonym for disorder or chaos. But now, it has been discovered that what appears to be merely chaotic disorder on the macroscopic (large-scale) level, is, in fact, highly organised on the microscopic (small-scale) level.

Today, the study of chemical instabilities has become common. Of special interest

is the research done in Brussels under the guidance of chaos theorist Ilya Prigogine. The study of what happens beyond the critical point where chemical instability commences has enormous interest from the standpoint of dialectics. Of especial interest here is the phenomenon of the "chemical clock." The Brussels model (nicknamed the "Brusselator" by American scientists) describes the behaviour of gas molecules. Suppose there are two types of molecules, "red" and "blue," in a state of chaotic, totally random motion. One would expect that, at a given moment, there would be an irregular distribution of molecules, producing a "violent" colour, with occasional flashes of red or

blue. But in a chemical clock, this does not occur beyond the critical point. The system is all blue, then all red, and these changes occur at regular interval.

"Such a degree of order stemming from the activity of billions of molecules seems incredible," say Prigogine and Stengers, "and indeed, if chemical clocks had not been observed, no one would believe that such a process is possible. To change colour all at once, molecules must have a way to 'communicate.' The system has to act as a whole. We will return repeatedly to this key word, communicate, which is of obvious importance in so many fields, from chemistry to neurophysiology.

Dissipative structures introduce probably one of the simplest physical mechanisms for communication." (Prigogine and Stengers, Order Out of Chaos, p. 148.)

The phenomena of the "chemical clock" shows how in nature order can arise spontaneously out of chaos at a certain point. This is an important observation, especial in relation to the way in which life arises from inorganic matter.

"'Order through fluctuations' models introduce an unstable world where small causes can have large effects, but this world is not arbitrary. On the contrary, the reasons for the amplification of a

small event are a legitimate matter for rational inquiry." (Prigogine and Stengers.) (Prigogine and Stengers, Order Out of Chaos, p. 206.)

We must remember that Hegel was writing at the beginning of the last century, when science was completely dominated by classical mechanical physics, and half a century before Darwin developed the idea of natural selection through the medium of random mutations. He had no scientific evidence to back up his theory that necessity expresses itself through accident. But that is the central idea behind the most recent innovative thinking in science.

This profound law is equally fundamental to an understanding of history. As Marx wrote to Kugelmann in 1871:

"World history would indeed be easy to make if the struggle were to be taken up only on condition of infallibly favourable chances. It would on the other hand be of a very mystical nature, if 'accidents' played no part. These accidents naturally form part of the general course of development and are compensated by other accidents. But acceleration and delay are very much dependent upon such 'accidents,' including the 'accident' of the character of the people who head the movement."

(Marx and Engels, Selected Correspondence, p. 264, Moscow, 1965.)

Engels made the same point a few years later in relation to the role of "great men" in history:

"Men make their history themselves, but not as yet with a collective will according to a collective plan or even in a definite delimited given society. Their aspirations clash, and for that very reason all such societies are governed by necessity, the complement and form of appearance of which is accident. The necessity which here asserts itself athwart all accident is again ultimately

economic necessity. This is where the so-called great men come in for treatment. That such and such a man and precisely that man arises at a particular time in a particular country is, of course, pure chance. But cut him out and there will be a demand for a substitute, and this substitute will be found, good or bad, but in the long run he will be found." (Marx and Engels, Selected Correspondence. Engels to Starkenburg, 25th January 1894, p. 467.)

The Notion

In Hegel's dialectic the supreme achievement of thought is the Notion. The development of the Notion is

described by Hegel as a process which proceeds from abstract to concrete. It signifies a deepening of knowledge, and a development from a lower to a higher degree of understanding, of the development from potential to actual. At the beginning, the Notion is referred to as "in itself," or implicit. It is later developed, and becomes the Notion "for itself," or explicit. In its highest form it is the union of both these aspect, "in and for itself." In the Notion the process of development reaches its highest point. What was only implicit at the beginning now becomes explicit. It is a return to the starting-point, but on a qualitatively higher level.

In his main work, *The Science of Logic*, Hegel does not end with the Notion, but goes on to the Absolute Idea, of which all that can be said is that he tells us absolutely nothing about it. This is typical of the contradictions Hegel's idealism landed him in. The dialectic cannot lead to an Absolute Idea, or any other final solution. To imply that there is an end to the process of human knowledge conflicts with the letter and spirit of dialectics. So the Hegelian philosophy ended up in an insoluble contradiction. This could only be solved by a radical break with all of previous philosophy.

The epoch-making quality of Hegel's

philosophy consisted in the fact that, by summing up the whole history of philosophy in such a comprehensive way, he made it impossible to proceed any further along the traditional philosophical lines. Secondly, the dialectical method, which he perfected, provided the basis for a whole new world outlook, one that did not confine itself to the analysis and criticism of ideas, but involved an analysis of the history of society and a revolutionary criticism of the existing social order. Hegel's great contribution was well expressed by Engels in *Anti-Dühring*:

"That [the] Hegel[ian system] did not solve the problem [it posed itself] is

immaterial here. Its epoch-making merit was that it posed the problem. This problem is indeed one that no single individual will ever be able to solve. Although Hegel was—with Saint-Simon—the most encyclopaedic mind of his time, he was restricted, first, by the necessarily limited extent of his own knowledge and, second, by the limited extent and depth of the knowledge and conceptions of his epoch. To these limits a third must be added. Hegel was an idealist. To him the thoughts within his brain were not the more or less abstract images of actual things and processes, but on the contrary, things and their development were only the realised images of the ‘Idea,’ existing somewhere

from eternity before the world existed. Consequently everything was stood on its head and the actual interconnection of things in the world was completely reversed.

"Although Hegel had grasped some individual interconnections correctly and with genius, yet for the reasons just given there is much that in point of detail necessarily turned out botched, artificial, laboured, in a word, upside down. The Hegelian system as such was a colossal miscarriage—but it was also the last of its kind. In fact, it was suffering from an internal and incurable contradiction. On the one hand, its essential postulate was the conception that human history is a

process of development, which, by its very nature, cannot find its intellectual final term in the discovery of any so-called absolute truth. But on the other hand, it laid claim to being the very essence of precisely this absolute truth. A system of natural and historical knowledge which is all-embracing and final for all time is in contradiction with the fundamental laws of dialectical thinking; which by no means excludes, but on the contrary includes, the idea that systematic knowledge of the entire external world can make giant strides from generation to generation." (Engels, *Anti-Dühring*, pp. 29-30.)

Hegel's dialectic was brilliantly

conceived, but ultimately deficient, because it was limited to the domain of thought. Nevertheless, it contained the potential for a major departure in thought, one that was to radically alter not just the history of philosophy, but that of the world. To paraphrase Hegel, what was present in itself (i.e., potentially) in his work became a realised idea—an idea in and for itself in the revolutionary doctrine of Marxism, where philosophy finally gives up its character as a one-sided abstract, mental activity, and enters the realm of practice.

Aristotle already explained the relationship between potential and actual. At all levels of nature, society,

thought, and even the development of individual human beings from childhood to maturity, we see the same process. Everything that exists contains within itself the potential for further development, that is, to perfect itself, to become something different to what it is. The whole of human history can be seen as the struggle of humanity to realise its potential. Ultimately, the aim of socialism is to create the necessary conditions whereby this goal can be finally realised, that men and women can become actually what they always were potentially. Here, however, we have already left the dimly-lit study of the philosopher, and stepped out into the broad daylight of human life, activity

and struggle.

"The philosophers have only interpreted the world, in various ways; the point, however is to change it." (MESW, Theses on Feuerbach, no. 11, Vol. 1, p. 15.)

Feuerbach

Between Hegel and Marx stands the tragic figure of Ludwig Feuerbach (1804-1872). After the death of Hegel, the Hegelian philosophy entered into a phase of rapid degeneration. The Hegelian school split into two wings—the right and left. The Hegelian right produced not one figure worthy of mention. The Hegelian left or Young

Hegelians represented the radical wing of Hegel's followers. Active in the 1830s and 1840s, they interpreted Hegel's ideas in the spirit of German liberalism. Their main emphasis was on the criticism of Christianity.

In 1835 David Strauss, a left Hegelian, published his book *Das Leben Jesu* (The Life of Jesus), a critical analysis of the Bible, in which Jesus is portrait as an ordinary historical personality. Later Bruno Bauer argued that religion was a false consciousness, and that the person of Jesus was a fiction. Although they made some advances, their general approach remained idealist, and therefore was condemned to sterility.

One of the main concerns was the question of how false consciousness arises in society and becomes a power over the minds of men.

Strauss explained this by the traditional persistence of mythological ideas. Bauer traced the source of this phenomenon to the alienation of the products of individual "self-consciousness." Max Stirner's ideas anticipated anarchism. However, their extreme individualism, according to which the motive force of history was the "critically thinking individual," reduced all their revolutionary threads to empty phrases. They regarded the masses as the "enemy of the spirit" and progress, and had no

notion of real social or economic development. However, the bankruptcy of the Hegelian left was finally exposed in the writing of Ludwig Feuerbach and the demolition was completed by Marx and Engels in their earliest joint writings —The Holy Family and The German Ideology.

A key role in the transition from Hegelianism to materialist dialectics was played by Feuerbach. To his own age, he seemed like Prometheus, the Titan who dared to steal fire from the gods and give it to humans. The appearance of his book, The Essence of Christianity in 1841, had revolutionary consequences. Specially great was his

impact on the young Marx and Engels. Engels later wrote: "Enthusiasm was general and we all became Feuerbachians at once." Feuerbach was a materialist. Born at Landshut in Bavaria, he started to study theology in Heidelberg, but within a year abandoned it, and, at the age of 20, went to Berlin to study philosophy under Hegel.

The young Feuerbach immediately fell under the spell of the great man, and become an ardent Hegelian. He later became a professor of philosophy at Erlangen. Although he was identified with the Hegelian left, Feuerbach was dissatisfied with its empty and abstract idealism, and set out to make a thorough

criticism of Hegel's philosophy from the standpoint of materialism. His writings, specially *The Essence of Christianity*, contain valuable insights, specially on the subject of alienation and the connection between idealism and religion. He was extremely critical of the idealist nature of Hegelian dialectics. His criticism had a revolutionary impact, and helped to shape the ideas of Marx and Engels. Unfortunately, Feuerbach ultimately failed to live up to his promise. His main mistake was, to use the German expression, to throw the baby out with the bath water. In rejecting Hegel's philosophy he also rejected its rational core—dialectics. This explains the one-

sided character of Feuerbach's materialism, which caused its downfall.

At the centre of Feuerbach's philosophy is man. But Feuerbach takes man, not as a social being but as an abstract individual. He regards religion as the alienation of man, in which human traits are made objective and treated as a supernatural being. It is as if man suffers from a kind of split personality, and contemplates his own essence in God. Despite its limitations, *The Essence of Christianity* still retains considerable interest, for its brilliant insights into the social and historical roots of religion. Ultimately, however, his conclusions are extremely weak. His only alternative to

the domination of religion is education, morality, love, and even a new religion.

Marx and Engels were disappointed by Feuerbach's reluctance to draw all the conclusions from his own ideas.

Feuerbach was persecuted savagely by the authorities, dismissed from the university in 1830, he spent his last years a tragic and virtually forgotten figure in an obscure village. The revolution of 1848 consigned the ideas of Feuerbach and the Hegelian left to oblivion. Ideas which had seemed radical before now appeared irrelevant. Only the revolutionary programme of Marx and Engels stood the test of fire.

Feuerbach did not understand the revolution, and remain aloof from the new movement founded by Marx and Engels, although at the end of his life he joined the German Social Democratic Party. Feuerbach's most important role was to act as a catalyst for the new movement. Somebody once remarked that the saddest phrase in any language is "might have been." This is more true of Feuerbach than any other philosopher. Having spent the greater part of his life in the wilderness, in the end, his destiny, like a philosophical John the Baptist, was to prepare the way for others.